MINING PLAN
FOR
KAKRI OPENCAST PROJECT
(4 Mtpa)

नार्दर्न कोलफील्ड्स लिमिटेड

NORTHERN COALFIELDS LIMITED

MARCH - 2019

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1.0 INTRODUCTION

1.1 The Kakri OCP is located in the north of Bina OCP of NCL in the Singrauli Coalfield, Distt- Sonebhadra (Uttar Pradesh).

1.2 Feasibility Report of Kakri OCP

The Feasibility Report of Kakri Opencast Mine for rated capacity of 2.50 Mtpa at an average stripping ratio of 2.25 m^3/t was prepared by CMPDI in February, 1979 and sanctioned by the Govt. for a capital investment of ₹50.54 Crores on 31.10.1980. The box cut was made in 1980-81 and coal production from this mine was started in 1982-83.

1.3 RCE for Kakri OCP (2.5Mtpa)

A revised cost estimates (RCE) was prepared by CMPDI and the same was sanctioned by the Govt. for ₹137.80 Crores on 07.09.1989.

The RCE of Kakri OCM was completed on 31.03.1993. However, the completion cost of the project as approved by the ESC of CIL Board in its meeting held on 21.07.1995 was ₹142.80 Crores.

1.4 Scheme for Augmentation of Coal Production

As desired by NCL, an Augmentation Scheme was formulated in November, 2000 for enhancing the coal production of the mine from 2.50 Mtpa to 3.0 Mtpa which was approved by the NCL Board in January, 2001 for a capital investment of ₹48.79 Crores.

1.5 Mining Plan for enhanced Coal Production (4 Mtpa)

As all the opencast projects of NCL are working 365 days per annum against the sanctioned schedule of 300 days per annum, there was possibility to enhance coal production to the tune of about 25% (maximum), more than the planned capacity of the mine.

Accordingly, the Mining Plan for enhanced coal production of 4.00 Mtpa was prepared by increasing efficiency for Environmental Management Plan (EMP).

1.6 Scheme for Maintenance of Coal Production of Kakri OCP

Scheme for maintenance of coal production (3 Mtpa) was prepared by CMPDI in 2008 considering the coal reserves within the acquired land under FC Act. At normative production of 3 Mtpa, balance life of the mine was estimated to be 8 years. NCL Board in its 137th meeting held on 20th March, 2009, approved the scheme with additional OB outsourcing.

1.7 Extension of Scheme for Maintenance of Coal Production of Kakri OCP

Further, in order to gainfully extract the estimated coal reserves of 10.01 MT available as on 01.04.2016, the Board of Directors of Northern Coalfields Ltd, in its 201st meeting held on 1st February 2016 at Varanasi, approved the Extension Scheme for Maintenance of Coal Production of Kakri OCP at the rate of about 2 Mtpa from 2016-17 to 2020-21.

1.8 Status of the Project

Kakri Opencast Mine has produced 78.89 Mt of coal and has removed 207.15 Mm^3 of OB till March, 2018. The actual progress of the project is given in Table No.1.

Table No.1

Years	Actual as report by project	
	Coal(Mt)	OB (Mm3)
1980-81	-	0.14
1981-82	-	0.14
1982-83	0.12	0.55
1983-84	0.50	1.13
1984-85	0.73	1.56
1985-86	0.76	1.85
1986-87	0.96	2.39
1987-88	1.22	2.59
1988-89	1.66	3.09
1989-90	1.56	2.57
1990-91	1.58	2.81
1991-92	1.75	3.81
1992-93	2.08	2.87
1993-94	1.46	3.00

1994-95	1.93	3.84
1995-96	1.98	4.80
1996-97	2.12	4.25
1997-98	2.12	4.87
1998-99	2.25	5.45
1999-00	2.54	5.61
2000-01	2.57	6.03
2001-02	2.64	6.13
2002-03	3.11	6.57
2003-04	3.00	6.41
2004-05	2.96	5.47
2005-06	3.28	6.29
2006-07	3.60	7.13
2007-08	3.38	7.27
2008-09	2.93	12.13
2009-10	3.53	9.70
2010-11	3.70	13.05
2011-12	3.38	13.71
2012-13	2.70	11.37
2013-14	2.50	7.56
2014-15	2.50	8.76
2015-16	1.87	8.84
2016-17	1.82	6.00
2017-18	2.10	7.41
Total	**78.89**	**207.15**

- EC for 4.00 Mtpa since 20.08.2007 onward.

1.9 EC/EMP Status

Environmental Clearance of Kakri OCP was granted vide letter No.J-11015/ 3/87-IA, dated 29.08.1989.

Again, the Project was granted Environmental Clearance under the provision of EIA Notification 1994 for a production capacity of 3 Mtpa vide letter No.J-11015/176/2003-IA.II (M) dated 11.05.2005.

Subsequently, the Project was granted Environment clearance from the Ministry of Environment and Forest, Government of India for expansion in production of coal from 3 Mtpa to 4 Mtpa vide letter No.J-11015/218/2007-IA.II(M), dated 20.08.2007. At that time, balance life of the mine was estimated as 6 years with enhanced production of 4 Mtpa. However, the mine could not attain the peak capacity and continued with the lower level of production as shown at Table No.1 above.

1.10 Need for Present Mining Plan

The environmental clearance (EC) of the Kakri Opencast Mine was initially granted vide letter No.J-11015/3/87-IA, dated 29.08.1989. Since EC is granted subject to a maximum of 30 years of mining projects, extension of validity of EC will be required for project to continue beyond 28.08.2019.

Application of renewal of forest lease granted to the project (required before 21st December, 2019) has also been submitted vide proposal No.FP/UP/ Min/29061/2017 dated 16.05.2018.

In view of the above, this mining plan has been prepared for the renewal/ Extension of validity of Environmental Clearance (EC) for Kakri OCP.

2.0 PROJECT SITE INFORMATION

2.1 Location & Communication

The Kakri Opencast Mine is located in North of Bina Project of NCL, in Singrauli Coalfield, Distt- Sonebhadra of Uttar Pradesh.

A metaled road connecting Waidhan in MP and Anapara in UP passes through Kakri Mine. The nearest railway station Krishnashila on Karela-Shaktinagar rail line of East Central Railway is situated at a distance of 5 Kms. from the Kakri OCM.

2.2 Physiography & Drainage

The physiography of Kakri area is characterized by hilly terrain on the west and south-west whereas towards the east it form a plain country extending into the GBP reservoir. There are number of nallas and streams mostly seasonal in nature and drain into GBP reservoir. The elevation of the project area varies from 265m in the east to 400m in the west.

2.3 Climate

The climate of the area is tropical. The minimum and maximum mean temperature recorded during winter (December-January) is 8.4^{o}C and

31.8^{o}C respectively. Similarly, in summer (May-June), the maximum and minimum mean temperature have been recorded as is 44.3^{o}C and 22.9^{o}C respectively. The average rainfall is 1111mm.

2.4 Land

The total land requirement for Kakri Opencast Project (4 Mtpa) has been broadly assessed as 828 Ha. The land requirement broadly includes the provision for mines area, external dumps, infrastructures and others. The type-wise land acquisition viz. Forest land, Government land, Agricultural land is given below in Table No.2.

Table No. 2

Sl. No.	Type	As per Mining Plan(Ha)	Land under possession (Ha)(Project)
1	Forest Land	185.84	185.84
2	Tenancy Land	359	359
3	Government Land	283.16	283.16
	Total	828	828

The total land is already under possession of the project. No additional land is required for the mine.

3.0 MARKETABILITY

The Kakri Opencast Mine is linked to Anpara 'A' TPS and coal is transported through customer owned MGR system. It also serves as Basket Linkage to meet the overall demand on NCL.

4.0 GEOLOGY

The geological data given in this report are as per Geological Report on Northern and Central Part of UP Block, Singrauli Coalfield prepared in December, 1973 by Exploration Division of CMPDI. The geological Report is based on the data of 24 boreholes drilled by GSI and 123 boreholes by NCDC, out of the above only 52 boreholes fall in the Kakri Block. The borehole density for Kakri Block is 26 boreholes per sq.km.

Description of coal seam

There are four coal seams occurring in the area viz. Kota, Turra, Purewa Bottom and Purewa Top seams in ascending order. The lower most Kota seam is reported to be highly inter-banded and the coal occurs only in thin bands and hence has not been considered for mining.

Turra Seam

Turra seam is the most attractive and important seam from exploitation point of view. This seam is partly burnt in the top of some boreholes located in the concealed outcrop zone. The burnt top portion of the seam is represented by burnt clay. Turra underlies Purewa Bottom seam after a parting of 39.80m to 51.75m. The full thickness of Turra seam including all dirt bands in the boreholes in which the seam is un-burnt varies from 19.54m to 22.70m. The total thickness of dirt band varies from 5.41m to 10.30m and constitute approximately 25.85 to 47.18% of seam thickness.

The board qualitative characteristics of Turra seam are given in Table No.5

Table No.5

Particulars	M (%)	Ash (%)	VM (%)	GCV (K.Cal/ Kg)	UHV (K.Cal/Kg)	Grade
Excluding all bands	7.4-8.1	18.5-21.0	26.8-28.5	5350-5510	4830-5105	G6-G7
Including all bands but excluding bands of thickness 1m and above	5.6-6.5	30.9-35.10	22.5-24.8	4175-4435	2980-3380	G10-G11

Purewa Bottom Seam

This seam overlies Turra seam after a parting of 39.80-51.75m and underlies Purewa Top seam after a parting of 36.88-46.83m. The full thickness of Purewa Bottom seam including all dirt bands varies from 8m to 11.45m.

Like Turra seam, there are a number of dirt bands in Purewa Bottom seam. The total percentage of (0-1m) bands on the basis of volumes of Purewa Bottom seam is about 12.4% and that of all bands (0-3m) is about 18.72%.

The board qualitative characteristics of Turra seam are given in Table No.6

Table No.6

Particulars	M (%)	Ash (%)	VM (%)	GCV (K.Cal/ Kg)	UHV (K.Cal/ Kg)	Grade
Excluding all bands	7.4-7.8	19.8-22.5	27.5-30.6	5361-5557	4731-5087	G6-G7
Including all bands but excluding bands of thickness 1m and above	6.7-7.0	29.0-32.6	-	4512-4837	3398-3847	G9-G10

Purewa Top Seam

Purewa Top seam overlies the Purewa Bottom seam after a parting of 36.88 to 46.83m. The full thickness of Purewa Bottom seam including all bands varies from 8.4m to 10.4m and the Purewa Top seam occurs within a depth range of 10m to 100m.

The percentage of 0-1m bands on the basis of volume of Purewa Top seam is about 16.4% and that of all bands (0-3m) is about 37%. The broad qualitative characteristics of Purewa Top seam are given in Table No.7.

Table No.7

Particulars	M (%)	Ash (%)	VM (%)	GCV (K.Cal/ Kg)	UHV (K.Cal/ Kg)	Grade
Excluding all bands	8.8-9.0	21.7-23.4	28.0-28.2	5072-5203	4552-4621	G8
Including all bands but excluding bands of thickness 1m and above	7.9-8.7	25.1-28.8	-	4695-4927	3712-4139	G9

5.0 GEO-MINING PARAMETERS

The mining and geological parameters of Kakri OCP is given in Table No.8.

Table No.8.

Sl. No.	Particulars	Turra Seam	Purewa Bottom Seam	Purewa Top Seam
I.	**COAL SEAMS**			
1	Seam Thickness	19.54-22.70	8.0-11.45	8.40-10.45
2	Average Dip, in Degree	5-12		
3	Volume weight of ROM coal(t/m^3)	1.60	1.65	1.65
4	Hardness co-efficient (Protodikonov's Scale)	1.2	1.2	1.2
5	Drilling Category	VIII	VIII	VIII
6	Excavation Category	III		
II.	**OVERBURDEN**			
1	External OB thickness above Purewa Top seam(m)	10-100		
2	Thickness of parting between Turra and Purewa Bottom seam (m)	40-52		
3	Thickness of parting between Purewa Bottom & Purewa Top seam (m)	37-47		
4	OB Volume weight (t/m^3)	2.40		
5	Hardness co-efficient (Protodia-Konov's Scale)	1-4		
6	Drilling Category	X		
7	Excavation Category	III-50%, IV-50%		
III.	**QUARRY PARAMETERS**			
1	Maximum width of the quarry in strike direction at quarry bottom (km.)	1.90		
2	Maximum length of the quarry in dip direction at quarry floor(km.)	1.36		
3	Maximum depth (m)	182		
4	Total area of excavation in sq.km.	2.00		

6.0 MINING TECHNOLOGY

6.1 Description of the Minefield

Kakri Opencast Mine having an area of 2.00 sq. kms is located in the UP Block. The adjacent existing Bina Extn. Opencast Mine lies on the southern side of this quarry. The terrain of this opencast minefield represents hilly terrain on the west and south-west, whereas towards the east it forms a

plain. The general elevation of the mine area varies from 265m in the east to 400m in the west.

6.2 Mine Boundaries

Delineation of Mine Boundaries

The criteria for fixing the quarry boundary are given below:

i) Northern Boundary: The northern boundary has been fixed at the boundary of Deohar Nalla.

ii) Southern Boundary: The southern boundary has been fixed at the boundary of Bina OCP.

iii) Western Boundary: The western boundary has been fixed at the Turra seam floor contour of about 140m.

iv) Eastern Boundary: The eastern boundary has been determined by the1:3 (Coal:OB) thickness ratio line in the concealed outcrop zone of Turra seam on the outcrop side.

6.3 Mineable Reserves & Overburden Estimates

The total mineable coal reserves as on 01.04.2018 are estimated as 6.08 Mt and the total volume of OB is estimated as 22.82 Mm^3 with an average stripping ratio of 3.75 m3/t. The seam-wise break-up of mineable coal reserves are given below:

Turra Seam	-	3.52 Mt
Purewa Bottom Seam	-	2.40 Mt
Purewa Top Seam	-	0.16 Mt
Total	-	6.08 Mt

6.4 Selection of Mining Method

Considering the mining and geological conditions of:

a) Flat gradient of 5^o-12^o of the coal seam;

b) Mining of multiple seams, viz. Turra Seam(19.54-22.70m), Purewa Bottom seam (8-11.45m) and Purewa Top seam (8.40-10.45m);

c) The parting between Turra and Purewa Bottom Seam being 40-52m;

a system of mining with the use of Shovel-Dumper combination is being implemented at the mine.

6.5 Status of HEMM

The status of HEMM has been shown in Table No.9.

Table No.9

Sl. No.	HEMM	Size/ Cap.	As per RCE (No.)	As per Aug. Scheme (No.	Total Sanctioned Provision (No.)	Existing As on 01.04.2018
A) **OBR**						
1	Elect. Rope Shovel	10m^3	3	1	4	3
2	Elect. Hyd. Shovel	8.3m^3	2	-	2	-
3	Hyd. Shovel	9.5m^3	-	-	-	1
3	RBH Drill	250mm	5	-	5	4
4	Rear Dumper	85T	25	9	34	17
5	Rear Dumper	50T	14	-	14	-
6	Dozer	410HP	5	2	7	2
B) **COAL**						
1	Hyd. Shovel	7.5m^3	1	-	1	-
2	Hyd. Shovel	5.5m^3	1	-	1	-
3	Hyd. Shovel	9.5m^3	-	-	-	1
4	Hyd. Shovel	3m^3	-	-	-	2
5	RBH Drill	160mm	3	-	3	3
6	Rear Dumper	100T	-	-	-	6
7	Rear Dumper	50T	14	-	14	-
8	Dozer	410HP	3	-	3	2
C) **COMMON**						
1	Mobile Crane	5/8/10/18/30/55T	2	-	2	6
2	Wheel Dozer	280HP	-	-	-	-
3	Motor Grader	280HP	2	-	2	3
4	Water Tanker	16KL	4	-	4	-
5	Water Tanker	28/70KL	-	-	-	5
6	Tyre Handler	101T	-	-	-	1
D) **LAND RECLAMATION**						
1	Dozer	410HP	3	-	3	4
2	Scrapper	11.5m^3	3	-	3	-

6.6 Sequence of Mine Development

The mining system proposed in the Kakri OCM is Inclined Slicing Method in coal seams and Horizontal Slicing Method in OB removal with Shovel-Dumper combination. At present, the OB benches are being worked by 3 Nos. of 10m^3 Elect. Rope Shovels and 1 Nos. of 9.5 m^3 Hyd. Shovel, which is working in conjunction with RD 85T/100T.

Turra seam and Purewa Bottom/Purewa Top coal seams are being worked by 1 No. of 9.5m^3 Hyd. Shovel & 2 No. of 3m^3 Hyd. Shovel in conjunction with RD 85/100 T.

6.7 Schedule of Quantities/Calendar Programme of Excavation

The production programme/Calendar programme of excavation as per the proposed mining plan is given below:

Year of Operation	Coal (Mt)	OB (Mm^3)
2018-19	2.10	8.50
2019-20	2.00	6.80
2020-21	1.98	7.52
Total	6.08	22.82

6.8 Mine Life

The estimated life of the project for balance mineable coal reserves works out to 3 years with present coal production target or till exhaustion of mineable reserve.

Adjacent to the boundary of Kakri OCP, Bina-Kakri Amalgamation Project/ Kakri North OCP have been planned to come up in future. The void created from Kakri Mine is likely to be utilized by these projects.

6.9 Design Criteria

The following design criteria has been envisaged for the mining operations as per proposed mining plan:

- No. of annual working days - 365 days
- No. of daily shifts - 03 Shifts
- Duration of each shift - 08 Hours.

The opencast mine is proposed to be worked on the above three shifts per days per week and 365 days per annum schedule.

6.10 Equipment Productivity

Annual productivity of various excavators has been calculated on the following basis:

a) Excavation Category OB – 50% Cat-III+50% Cat-IV

Coal- 100% Cat-III

b) Average overall annual standard utilization of shift hour:

Elect. Rope shovel	58%
Hydraulic shovel	61%

c) Factor allowed for travelling positioning etc. The following factor have been considered in the RCE:

Elect. Rope Shovel – 0.8

The above factors have been minimized/eliminated in the proposed mining Plan. Based on the above operating conditions and norms with efficiency improvement, the estimated annual production of various excavators is given below:

Sl. No.	Equipment	Annual Productivity
1	10m^3 Elect. Rope shovel + RD 85T	2.07m^3
2	9.5 m^3 Hyd. shovel + RD 85T	2.20 m^3
3	10 m^3 Hyd. shovel + RD 100T	2.78 m^3

The mine is presently operating with Shovel-Dumper system as envisaged in the RCE/Augmentation Scheme. At present RD 85 T & RD 100 T dumpers are operating in the mine. With the equipment provision in the RCE/Aug. Scheme, it will be possible to achieve targeted coal production.

6.11 Mine Plan

The following mine plans are included for the preparation of mining plan:

- Mine workings as on 01.04.2018
- Final Stage quarry plan
- Final Dump Plan
- Quarry cross-sections showing existing mine operations
- Quarry cross-section showing dump profile at the end of mining operations.

The Final Quarry Layout Plan of Kakri OCP is given in Plate No.3.

6.12 Drilling & Blasting

Drilling and blasting operations are necessary for loosening the OB and coal before excavation. Sufficient Nos. of Drills of 250mm (4 Nos.) and 160mm (3 Nos.) are existing.

6.13 Waste Disposal Techniques

As per present workings of mine the total volume of OB to be handled is 22.82 Mm^3, out of which about 15.00 Mm^3 of OB (65%) will be dumped in internal dump and remaining OB (35%) will be dumped in external dump. Spoil dumps are proposed to be formed in benches of 30m in height. The recommended ultimate dump slope should not exceed 28^o.

6.14 Mining Schedule

The Calendar Plan of mining operations has been formulated based on the adopted sequence of opencast minefield development and optimum conditions of mining operations for the entire balance life of the opencast mine. The calendar plan of excavation for Kakri Opencast Mine is given in Table No.10.

Table No.10

	Coal Production (Mt)				OB Removal (Mm^3)	SR (m^3/t)
	Turra	Purewa Bottom	Purewa Top	Total		
2018-19	1.22	0.83	0.05	2.10	8.50	4.05
2019-20	1.15	0.79	0.06	2.00	6.80	3.40
2020-21	1.15	0.78	0.05	1.98	7.52	3.80
Total	3.52	2.40	0.16	6.08	22.82	3.75

7.0 INFRASTRUCTURE

7.1 Coal Handling Plant

The present CHP in Kakri OCP is provided with 2 x 800 TPH crusher with 1200 TPH single stream belt conveyor system upto ground bunker. The 2X1200 loading conveyors after ground bunker are provided and pre-weigh hopper is provided with single swing chute loading arrangement with controlled loading system.

7.2 Power Supply Arrangement

Kakri OCP has only one power substation with 3 × 5 MVA transformers. The power demand is 7 MVA with annual power consumption of 21.1 MKWH. The power consumption of different units are as follows: -

Sl. No.	Unit	Annual Power Consumption (MKWH)	Monthly Power Consumption (KWH)
1	Township Power Consumption	7.24	1729600
2	IWSS Power Consumption	2.31	187392
3	CHP Power Consumption	2.73	225056
4	Mine Power Consumption	8.78	721952
	Total	21.07	2864000

7.3 Workshop

The existing mine workshop has been modified to accommodate 100T dumpers by increasing the width/height of the bays. There are total 5 Nos. of bays with additional workshop support services like mobile service van and fuel bowser for field equipment. Total 5 Nos. bays for general maintenance and 2 Nos. bays are meant for daily maintenance and periodic maintenance, tyre inflation and oil filling of new crane served bays for 85 T dumpers have been added. Certain additional workshop support services like mobile service van and a fuel bowser have also been added under the approved Augmentation Scheme.

7.4 Railway Siding

Kakri OCP is linked to Anpara TPS. Presently, coal handling plant dispatches coal to Anpara TPS through controlled loading system mounted over MGR loop-line owned by UPRVUNL. The dispatch capacity of existing MGR lines are adequate for coal production of Kakri OCP.

8.0 MANPOWER & PRODUCTIVITY

As per sanctioned RCE/Augmentation Scheme, total provision of manpower was 1404 with an OMS of 8.09 te at 100% level of production. There is 895 manpower only as on 01.04.2018. The OMS achieved during 2017-18 is 9.32 t.

9.0 SAFETY & CONSERVATON

9.1 Safety

The Rules & Regulations made under Mine's Act, 1952 should be observed for all kinds of mining operations and required safety measures taken.

Circulars issued from time to time regarding safety measures should be implemented. In order to ensure safety to personnel and equipment of the mine and to improve the working conditions of the mine, mining plan envisages following measures mainly:

- Attempts shall be made to remove/dress down the loose materials/ overhangs from high wall side to prevent any accidental falling of the same while advancing the cut.
- Haul road should be constructed by cutting solids not on fillings which is unsafe for movement of dumpers and other HEMM.
- Coal is prone to spontaneous heating and catches fire. Steps should be taken to find out the ways to solve fire problems at the mine.
- Sufficient width of haul road is provided/recommended.
- At least safety berm should be left on the benches.
- For stability, bench and dump slopes should be kept within permissible limit.
- Gradient of haul road should be within permissible limit.
- Sufficient lighting arrangement should be done in mine working areas.
- Communication network inside the mine should be strengthened.
- There should be intensive training on safety so that workers/ operators become more conscious of this vital issue.
- Compulsory medical examination of workers, staff and executives should be carried out and a systematic record of medical examination should be maintained. This will keep the person in fit condition and enable them to discharge their duties efficiently.
- Measures are suggested for dust control and pollution control.

9.2 Conservation

Rising coal demand profile coupled with limited cost reserves warrant immediate measures for conservation of coal.

The mining plan suggests following strategies to minimize coal losses and to improve conservation of coal:

- On OB bench above coal roof, drilling is not recommended below the roof of coal seam to avoid mixing of coal with OB due to blasting.

- Action shall be taken to solve fire problems so that coal loss due to fire can be minimized.
- Care should be taken in dumper loading so that there is no loss of coal during transportation. Attention should be given to minimize carpet losses of coal from coal yards.
- Due care should be taken/given for seam roof cleaning

10.0 ENVIRONMENTAL MANAGEMENT

A provision of ₹8.40 crores was made towards environmental control measures as per the sanctioned RCE/Aug. Scheme. This includes the cost of rehabilitation, compensatory afforestation, technical reclamation, community development, pollution control measures, etc. For the implementation of environmental control measures in Kakri OCP, the manpower requirement is 12 which will met from the total manpower provision for the mine.

Adequate number and size of equipment have been provided for the purpose of reclamation.

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MINE CLOSURE PLAN

1.0.0 INTRODUCTION

1.0.1 Name of Mine owner

Shri P. M. Prasad, Director Technical (P & P)

1.0.2 Location and Extent of Project/Lease Area

Kakri Open Cast Project is located in Moher basin of Singrauli Coalfields in Sonebhadra District of Uttar Pradesh. The total lease hold land area of Kakri Opencast is 828 Ha.

More details about the location of the project are given in 2.1 of Mining Plan. The location map of Kakri OCP is given in Plate No.1.

1.0.3 Type of Project/Lease Area

The lease area consists of Forest and Non Forest Land:

Sl. No.	Particulars	Total Area (Ha)
1	Forest	185.84
2	Government Land	283.16
3	Tenancy	359.00
	Total	828.00

1.0.4 Present Land use pattern

Sl. No.	Particulars	Total required Area (Ha)
1	Quarry Area	245
2	External Dumps	125
3	Mineral Storage	5
4	Infrastructure	14
5	Roads/Railways	9.5
6	Green Belt/Afforested Area	176
7	Effluent Treatment Plant	0.5
8	Coal Handling Plant	7
9	Township	46
10	Others including Safety Zone	200
	Total	828

1.0.5 Method of Mining

Considering the mining and geological conditions of the mine a system of mining with the use of Shovel-Dumper combination is being implemented at the mine. More details of mining technology and scheme of operation is given in section 6.0 of the Mining Plan.

1.0.6 Coal Processing Operation

There is no proposal for coal beneficiation for this mine. Un-washed crushed coal from coal handling plant / silo is being dispatched to power stations and other customer through railway siding.
Detailed description of Coal Handling Plant and railway siding is given in section 7.1 & 7.4 of Mining Plan.

1.1.0 Reasons for closure

1.1.1 Exhaustion of Minerals

Depending on prevailing geo-mining & techno-economic conditions, it has been decided to mine coal up to exhaustion of reserve in the proposed block.

The present closure plan is progressive mine closure plan. Adjacent to the boundary of Kakri OCP, Bina-Kakri Amalgamation Project/ Kakri North OCP have planned to come up in future. The void created from Kakri mine is likely to be utilized by these projects. Thus, the final decision of closure will be taken by the competent authority in appropriate time taking into account the life of the proposed adjacent Bina-Kakri Amalgamation Project/Kakri north OCP. The Final Quarry Layout Plan of Kakri OCP is given in Plate No.3.

1.1.2 Lack of Demand

The project is least likely to face lack of demand and lack of demand as reason for closure may be ruled out.

1.1.3 Un-economic operations

Uneconomic operations is not expected to be the reason for closure of Kakri Mine.

1.1.4 Natural calamity

The area has no such history of natural calamity which could lead to closure of mine.

1.1.5 Direction/court cases

As of now there is no direction/court cases regarding closure of Kakri Mine.

The Mine Closure Plan has been prepared as per the Guidelines approved by the Ministry of coal, Govt. of India and notified vide communication No. 55011-01-2009-CPAM on dated 27th August, 2009, 8th September,2009, 11th January, 2012, 25th April, 2012 and 7th January, 2013.

As per the notification all coal mine owners shall adopt a Mine Closure Plan for each of their mines comprising progressive Closure Plan and final Closure Plan duly approved by the Competent Authority.

In compliance of the notification this Mine Closure Plan for Kakri Opencast coal Mining Project has been prepared.

Mine closure encompasses rehabilitation process as an ongoing programme designed to restore physical and biological quality of environment disturbed by the mining to a level acceptable to all concerned. It must also aim to create a self-sustained ecosystem. Mine closure operation is a continuous series of activities starting from day one of the initiation of mining project.

Mine closure planning has to be carried out at the starting of the mine and needs periodic reviewing and revision during its life cycle to cope with the geo-technical constraints, safety risks and economic risks, social and

environmental challenges. Some other objectives of Mine Closure Planning are as follows:

a. To allow a productive and sustainable after-use of the site which is acceptable to the mine owner, adjacent mine owners (since all the mines are owned by the same company therefore it is done in an integrated manner), the regulatory authority, the local community and the other stake-holders.

b. To protect public health and safety.

c. To alleviate or eliminate environmental damage and thereby encourage environmental sustainability.

d. To minimise adverse socio-economic impacts.

Mine closure planning covers the progressive mining and post-mining phase of the project. Several attribute of progressive mine closure planning have to be implemented and introduced during the period of mine operation. Progressive mine closure process is undertaken concurrently with mine development/ production activities.

1.2.0 Statutory obligations

1.2.1 Special conditions imposed while execution of lease deed

Special condition imposed while execution of lease deed and Forest Clearance conditions is being complied and are enclosed as Annexure-1.

1.2.2 Approval of mining plan

The Mining plan will be put up for approval by NCL Board.

1.2.3 Directives/ conditions imposed by MoC/MoEF/SPCB/CPCB

The directives/conditions imposed by the MoC/MoEF/SPCB/CPCB are being compiled from time to time.

The Environment Clearance conditions issued vide Letter No. J-11015/218/2007-IA II(M) dtd 20.08.2007 and Letter No. J-11015/176/2003-IA.II(M) dtd 11.05.2005 are enclosed as Annexure-.2.

There is a need to define the liabilities, responsibilities and authorities of the mine management, other regulatory bodies, central and state governments after mine closure. Although no comprehensive legislation exists on mine closure, the following legislations are relevant to mine closure aspects of Coal Mines:

- The Mines Act, 1952.
- Coal Mines Regulations (Amendment)-2017: Regulations 6, 66,120,128,137 and 249 etc, of Coal Mines Regulations (Amendment)-2017 and its related DGMS Circulars.
- The Coal Mines (Conservation and Development) Act, 1974.
- Water (Prevention and Control of Pollution Act), 1974.
- Air (Prevention and Control of Pollution), Act 1981.
- Environment (Protection) Act, 1986 and Environment Protection (Amendment) Rule, 2000.
- The Hazardous Waste (Management, Handling and Trans boundary Movement) Fourth Amendment Rules, 2010.
- Mines and Minerals (Development and Regulation) Act 1957, amended up to 20-12-2009.
- Mineral Concession Rules 1960, amended up to 18-01-2000.

In addition documents like EIA/EMP submitted to MOEF&CC and the commitments made therein also have legal status.

1.3.0 Closure Plan Preparation

1.3.1 Decision of mine closure

The Kakri mine has been envisaged to produce 4.0 Mtpa (Peak) of coal. The mineable reserve of coal of Kakri project is expected to be up to 2020-21.

The present closure plan is progressive mine closure plan. Adjacent to the boundary of Kakri OCP, Bina-Kakri Amalgamation Project/ Kakri North OCP have planned to come up in future. The void created from Kakri mine is likely to be utilized by these projects. Thus, the final decision of closure will be taken by the competent authority in appropriate time taking into account the life of the proposed adjacent Bina-Kakri Amalgamation Project/Kakri north OCP . The Final Quarry Layout Plan of Kakri OCP is given in Plate No.3.

2.0 MINE DESCRIPTION

2.1 Geology

2.1.1 Topography

The physiography of Kakri area is characterized by hilly terrain on the west and south-west whereas towards the east it form a plain country extending into the GBP reservoir. There are number of nallas and streams mostly seasonal in nature and drain into GBP reservoir. The elevation of the project area varies from 265 m in the east to 400 m in the west.

2.1.2 Rock types

Detailed description of geology of the block area is given in section 4.0 of Mining Plan.

2.1.3 Toxic Elements Study

Toxic elements study of coal samples from coal seams of NCL mines has been tested by IIT BHU & CIMFR Dhanbad. Result shows elemental parameters are within permissible limits.

2.1.4 Geological Structures

Details of the geological features of the area is given in section 4.0 of Mining Plan.

2.1.5 General

Details of the geological features of the area is given in section 4.0 of Mining Plan.

2.1.6 **Fault**

Details of the geological features of the area is given in section 4.0 of Mining Plan.

2.2.0 **Reserve**

The total mineable reserve as on 01.04.2018 is estimated as 6.08 Mt.

2.2.1 **Study about category of coal**

Details of seam-wise and grade-wise geological and mineable reserves is given in 4.0

2.2.2 **Balance quantity of Coal reserve at time of mine closure**

There will be no coal reserve at the time of closure as the mine is expected to be exhausted at the time of closure.

2.3.0 **Mining Method**

Details of Mining Technology and Scheme of operations is given in section 6.0 of Mining Plan.

3.0.0 **CLOSURE PLAN**

3.1.0 **Mined Out Land**

3.1.1 **Proposal/Measures implemented for reclamation**

The project report envisages concurrent land reclamation of mined out land. The reclamation is to be done in phases:

Phase-I Physical/Technical Reclamation

Technical reclamation is the process of back-filling of excavated area with overburden in a systematic manner. It entirely depends on the depth and volume of overburden removed and equipment used for mining.

Technical reclamation involves breaking and leveling the top of OB dumps, filling of gullies and terracing etc.

In the external dump, tiers of 30 m will be made with maximum slope of 37^{o} and the overall slope of the dump will be kept at 28^{o} to avoid slope failure. Maximum height of the external dump has been kept at 90m above the original ground level. For better stability of internal dumps, it is suggested to rip the mine floor in strips before back-filling. It is suggested to level the dumps and grade them outward properly to obviate water accumulation.

Phase-II Biological Reclamation

Biological reclamation is the Phase-II of reclamation process. The physical, chemical and biological characteristic of the top surface of mine spoil is totally different than the original soil, which can be seen from the analysis results of natural forest soil and OB material. The reclamation at the waste dump sites should be ecologically sustainable. The local species may be encouraged and species are so chosen that the slope, bottom of dumps and top of the dumps are able to sustain these species.

Re-vegetation covers in terms of grass & trees of appropriate species are raised over the physically reclaimed land. It is to be ensured that in the final land use plan, major portion of land acquired for the project shall be reclaimed as forestland. Mined out area shall be suitably reclaimed for vegetation. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface runoff. In critical area, use of geo textiles shall be undertaken for stabilization of the dump. Both progressive technological & biological reclamation shall be carried out as per Environmental Management plan.

As per the detailed plans out of 245 ha of mined out area 196 ha will be reclaimed (along with reclamation of 125 Ha external dumps) and balance 49.0 ha will be void. Progressive Green Belt development & Biological reclamation plan till closure is given in Para-3.4.4 & 4.0.

3.1.2 Rehabilitation of mined out land

The reclamation of mined out land will be a concurrent with mining operations. The post mining land use at the end of mine life will be as follows:

Post Mining Land Use

Sl. No.	Land Use	Area (Ha)	Post-mining land use
1	Reclaimed external O.B Dump area	125	Green Land
2	Reclaimed(including backfilled) area	196	Green Land
3	Quarry void	49	Green Land**
4	Roads/Railways	9.5	Public Use
5	Green Belt	176	Green Land
6	Township	46	Residential
7	Built up Area*	21.5	Green Land*
8	Undisturbed Area	205	Undisturbed
	Total	**828**	

* The built up area like CHP, ETP etc. if not required by adjoining projects would be dismantled and afforested.

** The void will be partially backfilled during operation of Bina-Kakri Amalgamation Project followed by technical cum biological reclamation.

3.1.3 Actual site restoration for post mining land use

There will be significant increase in forest cover post-mining due to proposed reclamation activities and actual site restoration with improved green cover is targeted in the final mine closure plan.

The proposed Final Dump Plan is enclosed as Plate-5 and Land Reclamation Plan at post mining stage is enclosed as Plate-8**.**

3.1.4 Method of restoration/reclamation/Rehabilitation

Method of restoration/reclamation/rehabilitation has been described in the section 3.1.1.

3.1.5 Afforestation in first phase mined out area while commencing the mining in second phase

Mining is to be carried out in a phased manner initiating afforestation work in the mined out area of the first phase while commencing the mining in the second phase i.e. continuation of mining activities from one phase to other indicating the sequence of operations depending on the geo-mining conditions of the mine.

3.1.6 **Progressive mine closure plan shall be prepared for a period of five years from the beginning of the mining operation**

The present plan is progressive mine closure plan prepared for a period of 3 years. The final mine closure plan will be made five years before the final closure Project.

3.1.7 **These plans would be examined periodically in every five years period and be subjected to third party monitoring by the agencies approved by the Central Government**

These plans would be examined periodically in every five years period and be subjected to third party monitoring by the agencies approved by the Central Government like the Central Mine Planning and Design Institute (CMPDIL), National Environmental Engineering Research Institute (NEERI), Indian School of Mines (ISM) etc. for the purpose.

3.2.0 Water Quality Management

3.2.1 Details of existing Surface and Ground Water bodies in MLA

Runoff from mine area flow through different streams into Deohar Nallah and ultimately into GBP Sagar. The Deohar Nallah has scanty flow except for the rainy season.

3.2.2 Steps for Water Quality protection

Following water quality protection measures are taken:

a) **Control of erosion:** The possible sources of surface water erosion are the OB dumps. In order to prevent erosion from the OB surfaces massive

plantation is being done on it. Till date 1595600 plants have been planted on 153.89 ha area of OB dump (external and internal dumps combined).

The slopes of OB dumps are restricted to overall slope of 28^{o}. Such a mild slope not only caters the stability requirement of dumps but also decelerates the surface runoff thereby minimizing the erosion. The haul roads are properly paved and wherever possible black top roads are provided to minimize erosion.

b) Sedimentation: The runoff of OB dumps is channelled to sump provided in the mid-section of quarry which act as a sedimentation unit.

c) Diversion of water courses: No water courses were encountered in the mine lease area so no such diversion was needed.

d) Water Treatment: For domestic sewage treatment a 1 MLD (million litres per day) Sewage Treatment Plant is there. The water discharged from workshop, washing platforms and from CHP is first passed through an Oil and Grease Trap and subsequently through a 27 MLD capacity Effluent Treatment Plant for final treatment. The treated water from ETP is used for dust suppression and other industrial purposes.

e) Control of siltation: To arrest the silt brought by surface runoff Catch drains of approx. 700 m length have been constructed around the OB dumps which have their out let in a siltation pond made to collect these surface runoffs and mine water.

- At the toe of the dump, a retaining walls/RRM walls have been provided to arrest flow of silts.
- A series of open drains have been provided on dump body to arrest surface run-off and prevent siltation.

f) Hydrogeology Study in the area:

The permeable formations within the Gondwanas behave as aquifer units. The three coal seams and shells developed behave as impermeable beds i.e. aquiclude. Below the soil cover thick Barakar formations exist.

The formation comprising mainly of alluvium and weathered sandstone (thickness 1 m – 48 m) lying above the top-most working seam, Purewa Top, behaves as unconfined layer. Whereas, lower formations consisting of compact sandstone with secondary porosity behave as semi-confined to confined aquifer.

The various hydrogeological units developed in Kakri Project is as mentioned below:

Hydrogeological Unit	Formation	Thickness (m)
Phreatic Aquifer	Soil, subsoil, weathered sand stone	1 – 48.6
Aquiclude	Coal seam-Purewa Top (working seam)	8.4 – 10.5
Aquifer	Medium grained sand stone with thin shale	36.9 – 46.8
Aquiclude	Coal seam-Purewa Bottom (working seam)	8-11.5
Aquifer	Medium to coarse grained sand stone with thin shale	39.8 – 51.8
Aquiclude	Coal Seam-Turra (working seam)	19.5 – 22.7

Recharge Area and Discharge Area:

Recharge Area: The Recharge zone is from the elevated grounds covered with forests located west of the Kakri OCP. The recharge is mainly from rainfall to the phreatic aquifer. Deeper aquifer get recharged from the out crop region and leakage from phreatic aquifer.

Discharge Area: The discharge area is the low lying flat terrain in GBP Sagar located in the east and south-east of the project.

g) Water Balance chart

Based on the EMP of 4.0 MTY the water balance chart of the study area is given as below:

	Water Balance chart	
A	Net Annual Ground water Recharge	72.93 Mm^3
B	Net Annual Ground water Draft	14.12 Mm^3
	Balance Annual Ground water Recharge (A-B)	58.81 Mm^3

To assess the impact of opencast mining on local water regime, a regular seasonal monitoring of ground water level and quality is being carried out by establishing a network of 51 no's existing dug wells in the study area.

Analysis of ground water samples from monitoring wells around Kakri Project indicates that the water quality is generally suitable for domestic use. The pH ranges from 7.00 to 8.00 standard units, concentration of dissolved solid, sulphate, iron, manganese, nitrate, fluoride and other heavy metals are found within the drinking standard (IS-10500). In the study area the historical ground water level variation is as follows:

Sl. No.	Season	Water level (bgl) in m (Study area-10 Km radius)
1	Pre-monsoon	6.12 to 8.13
2	Post- monsoon	4.43 to 7.19

h) Treatment of Acid Mine Drainage:

There is no such problem of Acid mine drainage at this mine.

3.3.0 Air Quality Management Plan

3.3.1 Existing Air Quality Status:

With progressive mine operation & closure, the Ambient air quality of Kakri OCP is being monitored regularly on fortnightly basis for all seasons by measuring the concentration of SPM,PM 10, PM 2.5, SO_2 & NO_X . The existing ambient air quality of Kakri OCP is being monitored at four locations/stations in core zone and four locations in buffer zone, which are as follows:

Core Zone:

Sl. No.	Location	Location code	Category
1	Kakri Substation Mine Site	KKA1	Industrial
2	Vocational Training Center	KKA2	Industrial
3	View Point/Field Office	KKA3	Residential
4	Guest House	KKA4	Residential

Buffer Zone:

Sl. No.	Location	Location code	Category
1	Rehata Village	KKA4	Residential
2	Audi Village	KKA5	Residential
3	Chandrapur Rehabilitation Site	JHA5	Residential
4	Jawahar Nagar	BA5	Residential

3.3.2 Measures to control Air pollution:

Following mitigation measures are in vogue

- All drills are fitted with dust collection arrangements
- Approach roads to mine and service roads are provided with black topping to reduce dust generation.
- Water sprinklers are provided for dust control on haul roads
- Green belts provided along roads & plantation in vacant land in industrial & township areas for dust control
- In coal Handling Plant (CHP), dust control system and sprinklers are provided at coal receiving pits. Fixed sprinklers are provided for coal bunkers, transfer points and loading points.

For Kakri OCP, monitoring of Ambient Air Quality and above Air Quality Control measures will continue for progressive mine operation & closure. After closure, Ambient Air Quality will be monitored for a period of 3 years, if required further control measures will be taken.

3.4.0 Waste Management

3.4.1 Details of type, quality and quantity of OB, Coal rejects, location plan longitude, latitude

Waste that is generated in course of coal mining is overburden material consisting of fragments of sandstone of assorted size. They have not been found to generate acid mine drainage or leach high quantity of heavy metals.

There are three external dumps in Kakri OCP. The total area occupied by them is 125 Ha. The backfilled area would occupy a cumulative area of 196 Ha.

The total OB generated since inception of mine is 207.15 Mm^3 (up to 31.03.18).The current mining plan envisages 22.82 Mm^3 of remaining OB (as on 01.04.18) to be excavated. The total OB generated would be used for backfilling.

3.4.2 Year–wise progress of OB removal in terms of height of OB dump and No. of benches etc.

Proposed calendar programme of coal production & waste (OB) management as given in Mining Plan is as below:

Year of Operation	Coal (Mt)	OB (Mm^3)
2018-19	2.10	8.50
2019-20	2.00	6.80
2020-21	1.98	7.52
Total	6.08	22.82

3.4.3 Their disposal practice

The OB that would be generated now on i.e from 01.04.18 would be completely used for backfilling of de-coaled area. Afterwards technical and biological reclamation of these backfilled areas will be done according to method described in previous sections.

3.4.4 Stabilization of waste-Physical, biological year wise progress to be achieved (No of plantation)

Years	Backfilled Area	OB Dumps	Undisturbed Area	Total
2018-19	Nil	Nil	Nil	Nil
2019-20	Nil	Nil	10000	10000
2020-21	37,500	16,700	20000	74200
Post Closure	362500	-	-	-

3.4.5 Measure for prevention of siltation, erosion and dust generation, and their dispersal in the air, environment, leaching in the surface and ground water

Several mitigation measures are proposed for stabilization of the dump and prevent siltation & erosion.

- At the toe of the dump, a retaining wall/ RRM walls have been provided to arrest flow of silts.

- A series of open drains have been provided on dump body to arrest surface run-off and prevent siltation.

3.4.6 **Details of reclamation and afforestation with mining activity**

Details have already been given in 3.1.1.

3.4.7 **Waste material re-handled or back filled in the final voids for safety**

The OB generated (after 01.04.18) would be backfilled in the voids formed after coal extraction. Only an area of 49.0 Ha is to remain. The void will be partially backfilled during operation of Bina-Kakri Amalgamation Project followed by technical cum biological reclamation.

3.4.8 **Efforts for minimum land requirement and degradation of land due to external OB**

The dump plans of the project has been planned to accommodate maximum possible OB volume in internal OB dump and rest a small part in external OB dumps, so that land requirement for external OB dump is minimum for whole life of different projects.

While designing the OB dumps of the project, technical parameters such as width, height, slope of dump etc. have been taken into consideration for safe OB dumping, so that there is minimum impact on environment and land degradation.

3.4.9 **Proposal to recharge and stabilize the water table in the surrounding areas**

The project is having small ponds for conservation measures to augment the ground water resources. This will help in recharging and stabilizing the groundwater table in the surrounding area.

The project has already taken up the groundwater table monitoring of dug-wells in and around the project area to watch any depletion in water table.

3.5.0 Top Soil Management

Top soil replacement is a very necessary and effective way of enhancing the physical and nutrient status of OB material. The top soil, if any, shall be temporarily stored at earmarked site(s) only and it should not be kept unutilized for long.

The topsoil shall be used for land reclamation and plantation. A proper top soil replacement can assure the following improvements in OB quality:

a) Increased water holding capacity
b) Improved nutrient supplying capability
c) Improved buffering capacity
d) Increased plant root depth.

3.5.1 Details of top soil available and its utilization

At Kakri OCP, it is found that there is hardly any top soil present in the lease hold area and the total terrain is hilly. Wherever top soil will be found, it shall be stacked separately at earmarked site.

3.5.2 Quantity and details of preserving it

Whenever top soil will be found it will be preserved as follows:

a) Top soil removed will be stock-piled only when it is impractical to promptly redistribute on required area.
b) Stock piled top soil shall be selectively placed on pre designed area.
c) A vegetative cover will be generated immediately on the stock pile to prevent erosion.

3.6 Management of Coal Rejects from Washery

There is no proposal for Coal Washery for this mine.

3.7.0 Infrastructure

3.7.1 Details of existing infrastructural facilities

Several infrastructures have been provided that includes:

i. Workshop facilities

ii. Office complex
iii. Townships
iv. Coal Handling Plants
v. Railway siding for transportation of coal
vi. Power Network including sub-stations
vii. Industrial and domestic effluent treatment plants
viii. Community facilities

3.7.2 Decommissioning proposed and their dismantling and disposal proposal

At the end of mining operations, it is proposed to decommission the Industrial infrastructures. However, before such decommissioning other infrastructures like office complex, residential complex, roads, pipelines and transmission line and community facilities, the possibility of re-use of these infrastructures for the neighboring mines shall be explored.

Salvaged materials/equipment would be used for creating infrastructures facilities for coal mines that are likely to be developed in the coalfield in future. The unusable materials will be disposed off. After decommissioning of industrial infrastructure facilities, the leasehold area will be leveled.

The community facilities developed during the mine life like educational facilities, health facilities etc. would be continued even after the mine closure. The final closure plan will envisage interaction of mining company with the State or local bodies for running these facilities.

3.8 Disposal of Mining Machinery

The machineries that can be used would be diverted to new/existing projects. Other machineries that have exhausted its life will be disposed off by auctioning and removed from the site.

3.9 Safety & Security

While carrying out all kinds of mining and allied activities in the mine, the safety rules in force as per Rules & Regulations made under Mines Act, 1952 is being observed and required safety measures are taken. There will be various elements of safety & security at the time of mine closure, which

will be dealt under above Rules & Regulations. The Safety & Security hazard include the followings.

Safety hazards including management of fire:

In the Final mine closure plan, action for control of likely fire areas of the mines will be discussed. Action will also be suggested to cover all the safety aspects.

Management of Pit Slopes and Waste Dumps:

The final quarry slopes has been so designed and subsequently developed so that after the closure of the mine, there is no likelihood of any slope failure. The final slope of the quarry has been designed with above consideration. However, strict compliance with the proposed final slope of quarry would be made as given in Quarry & Surface Layout Plan and subsequent slope stability studies.

Waste Dumps:

The external waste dump shall be developed as per the proposed design so that slope failures do not create any safety hazard to the local community. The external dump will be formed in number of decks, each deck will have 30 m (maximum) height & slope of 37^{o} (maximum) to avoid dump slope failure, overall dump slope shall be maintained within 28^{o}.

Waste dumps shall be provided with garland drains and vegetation cover on surface of these dumps.

Fencing around mined out area:

To prevent illegal mining and considering safety of human & fauna, mined out area shall be properly fenced and all the entries to the mine shall be effectively sealed.

Management of final voids:

As per mine plan of Kakri OCP, major portion of quarry will be back filled and reclaimed; only an area of 49.0 ha would turn out to be void. In the final mine closure plan, design of voids due to mining are to be dealt and

the final land use plan will include filling of the voids for land reclamation wherever possible and for hydro reclamation wherever feasible.

3.10.0 Economic Repercussions Of Closure Of Mine

3.10.1

a) Number of local residents employed

A total of 468 families have been rehabilitated in Kakri, Parasi, Rehta and Basi villages.

b) Status of continuation of family occupation

There is less likelihood of continuation of their family occupation as the land acquired will be used for plantation on closure.

c) Scope of joining the occupation back

Near the end of the mine life, manpower will start getting reduced. The reduction of manpower could be done as per the following options:

i. Natural retirement
ii. Retraining and redeployment of younger groups in other mines.
iii. Transfer of experienced middle aged groups to other projects.

3.10.2

a) Compensation given:

Compensation of ₹2.34 Cr has been paid by the project as per the records available.

b) Compensation to Employees:

Since employees are to be redeployed on closure of mine, they will continue to enjoy the regular pay and other benefits. As such there is no need for additional compensation.

3.10.3

a) Satellite Occupations connected to the mining industry:

Number of satellite occupations like transport, explosive industry, electrician, automobile mechanic, local shops, dairy etc. is connected with the mining industry.

b) Number of persons engaged therein

No such study has been carried out to determine the number of persons engaged in satellite occupations.

c) Continuance of such business after mine closure

Once the mine closes, some of these activities would be affected. But this effect would be of temporary nature as there are many number of adjoining mines whose demand would have to be catered by these businesses.

3.10.4

a) Rehabilitated status of MLA

The rehabilitation site for the affected persons due to Kakri OCP is the Rehata Rehabilitation Complex. The site has been so planned that it constitutes part of the existing Rehata village. The families continue to be in rural matrix while enjoying the facilities provided by NCL. The basic amenities provided at Rehabilitation site are as follows:

1.	Health Centre- 1 No.	6.	Open Wells- 8 Nos.
2.	Primary School-1 No.	7.	Internal Road-7.5 Km
3.	Panchayat Hall- 1 No.	8.	Drain- 2.5 Km
4.	Shopping Centre-4 shops	9.	Street Light- 6.5 Km
5.	Hand Pump- 18 Nos.	10.	Plantation

b) Other Remnant activities

The remaining rehabilitation activities will be carried out at the time of final mine closure.

3.10.5 **Expectation of society on closure of mine:**

The mine extends several community development facilities to the population living in this vicinity. On closure of the mine this will cease.

The project affected persons (PAPs) are provided many civic facilities on the line of the management of community facilities dealt above. The final closure plan will envisage interaction of mining company with the State or local bodies for running these facilities.

4.0 TIME SCHEDULING FOR ABANDONMENT

Mine closure in terms of progressive internal and external dumping, technical & biological reclamation is concurrent with the mining process. The Land Reclamation Plan is given in Plate No.8.

Detailed mine closure plan shall be prepared & submitted before actual closure. However, tentative closure activities at the time of mine closure are scheduled below:

Sl. No.	Activities	Year after closure				
		1st Year	2nd Year	3rd Year	4th Year	5th Year
1	Mine Pit&Dump Management	-------				
2	Pit water body Management	--------	-------	-------		
3	Plantation and its after care	--------	-------	-------	-------	--------
4	Disposal of Mining Machinery	--------	------	-------		
5	Infrastructure Dismantling		------	-------	-------	
6	Environmental Monitoring	--------	------	-------		
7	Fencing			-------	-------	

5.0 Abandonment Cost

As there is no increase in area and mining is being done within the same leasehold for extraction of balance coal, there is no necessity of additional amount to be deposited in Escrow account.

6.0 FINANCIAL ASSURANCE

For financial assurance, Northern Coal Field Ltd has opened an Escrow Account with Union Bank of India, Morwa, Singrauli, with the Coal Controller Organization (on behalf of the Central Government) as exclusive beneficiary.

Mining is to be carried out in a phased manner initiating afforestation/reclamation work in the mine out area of the first phase while commencing the mining in the second phase i.e. continuation of mining activities from one phase to other indicating the sequence of operations depending on the geo-mining conditions of the mine. Up to 80% of the total deposited amount including interest accrued in the Escrow account may be

released after every five years in line with the periodic examination of the Closure Plan as per Clause 3.1 of the Annexure of the guidelines.

The amount released should be equal to expenditure incurred on the Progressive Mine Closure in past five years or 80% whichever is less.

The balance amount at the end of the Final Mine Closure shall be released to mine owner/leaseholder on compliance of all provisions of Closure Plan duly signed by the lessee to the effect that said closure of mine complied all statutory rules, regulations, orders made by the Central or State Government, statutory organizations, court etc. and duly certified by the Coal Controller.

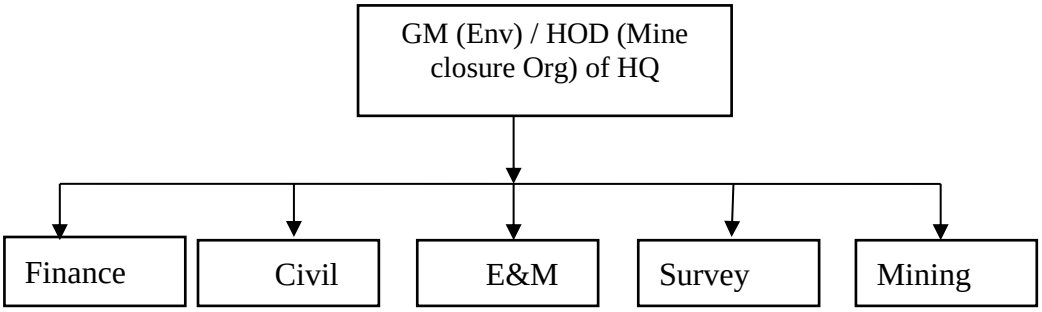
An agreement, outlining detailed terms and conditions of operating the Escrow Account, shall be executed amongst the mining company, the Coal Controller and the concerned bank in order to give effect this.

7.0 RESPONSIBILITIES OF MINE CLOSURE

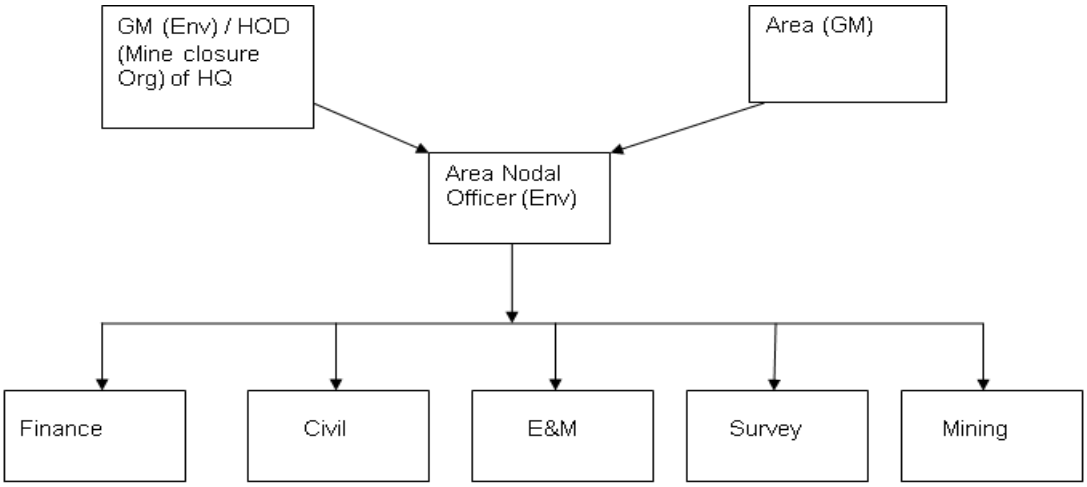
For the purpose of monitoring of mine closure activities, the unit as well as area and HQ levels of the production company should set standard system and form a mine closure cell. The team of monitoring at different level should consist of member each from Mining, Environment, E & M, Finance, Civil and Survey cadre etc.

Mine Closure Organization has to be created in all subsidiaries and all areas of the subsidiaries. This organization is to be headed by a nodal officer preferably GM (Environment)/ HOD (Mine Closure Org.) of the subsidiary at the Head Quarters. Below this Officer will be the Area Nodal Officer, preferably HOD (Env.) of the Area. The typical organization of the HQ and area will consist of executives from Finance, Civil, E&M, Mining and Survey. Organization chart is given below:

Mine Closure Organization at HQ Level



Mine Closure Organization at Area Level:



Team should keep the accounting of technical and financial impacts of different mine closure activities stated in Mine Closure Plan.

The company should also prepare accounting methodology by introducing separate code for each activity. All the expenditure should be booked under the said prefixed code as also suggested by Finance Division.

This will help CMPDIL or any other agency under Mine Closure Guidelines to monitor mine closure activities of any mine of Production Company. Company should have sufficient documentary evidences for reimbursement from the Escrow account (duly signed by the above MCP

committee) after each progressive stage as well as after final stage of mine closure. Apart from above documentary evidences monitoring should also include the following:

(i) Satellite imagery of plantation.

(ii) Audio – Visual documentation of different mine closure activities.

As per final MCP, provision of additional fund to be added/assessed and included in final MCP. For abandoned and closed mines if there is no provision of escrow account the subsidiary has to provide fund as required.

8.0 PROVISION FOR MINE CLOSURE

The mine owner shall be required to obtain a mine closure certificate from Coal Controller to the effect that the protective, reclamation and rehabilitation works in accordance with the approved mine closure plan/final mine closure plan have been carried out by the mine owner for surrendering the reclaimed land to the State government concerned.

The balance amount at the end of the final Mine Closure shall be released to mine owner on compliance of all provisions of Closure Plan duly signed by the mine owner to the effect that said closure of mine complied with all statutory rules, regulations, orders made by the Central or State government, statutory organizations, court etc. and duly certified by the coal Controller. This should also indicate the estimated extractable coal reserves and coal actually mine out.

If the coal Controller has reasonable grounds for believing that the protective, reclamation and rehabilitation measures as envisaged in the approved mine closure plan in respect of which financial assurance was given has not been or will not be carried out in accordance with mine closure plan, either fully or partially, coal controller shall give the mine owner a written notice of his intention to issue the orders for forfeiting the sum assured at least thirty days prior to the date of the order to be issued after giving an opportunity to be heard.

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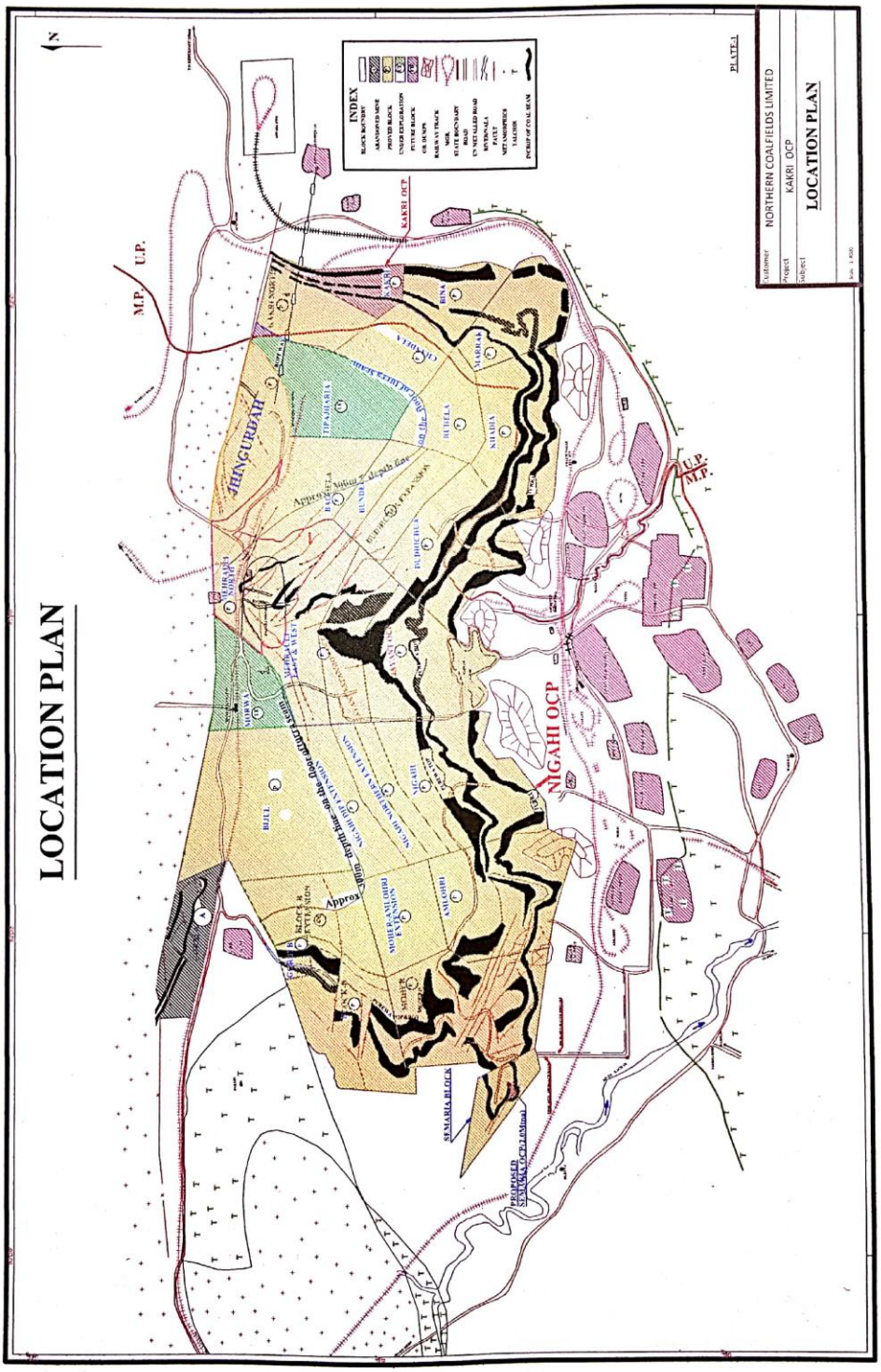
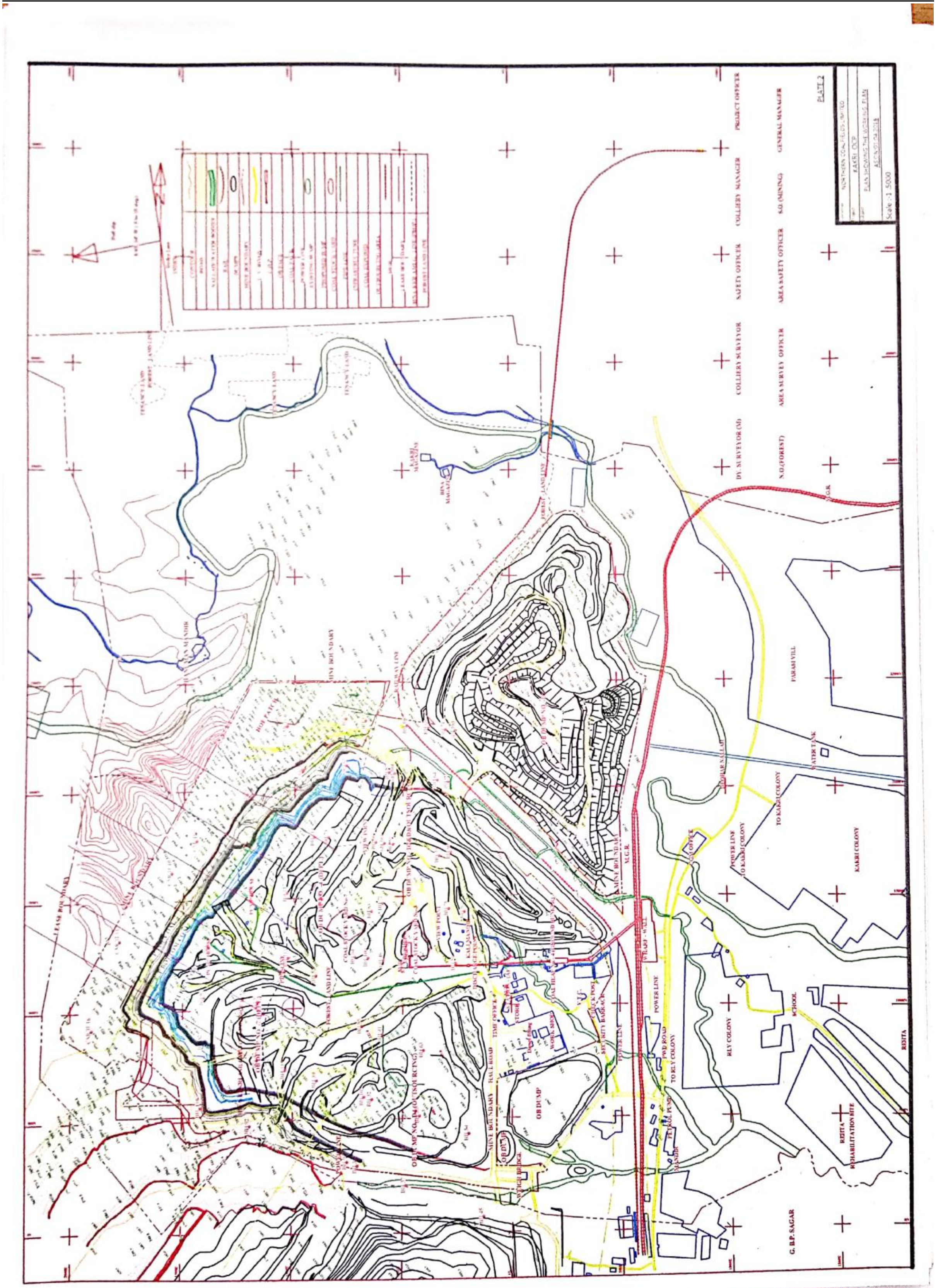

LOCATION PLAN
INDEX
KAKRI OCP
NIGAHI OCP
JHINGURDAH
SEMARIA BLOCK
M.P.
U.P.
NORTHERN COALFIELDS LIMITED
KAKRI OCP
LOCATION PLAN
PLATE-I



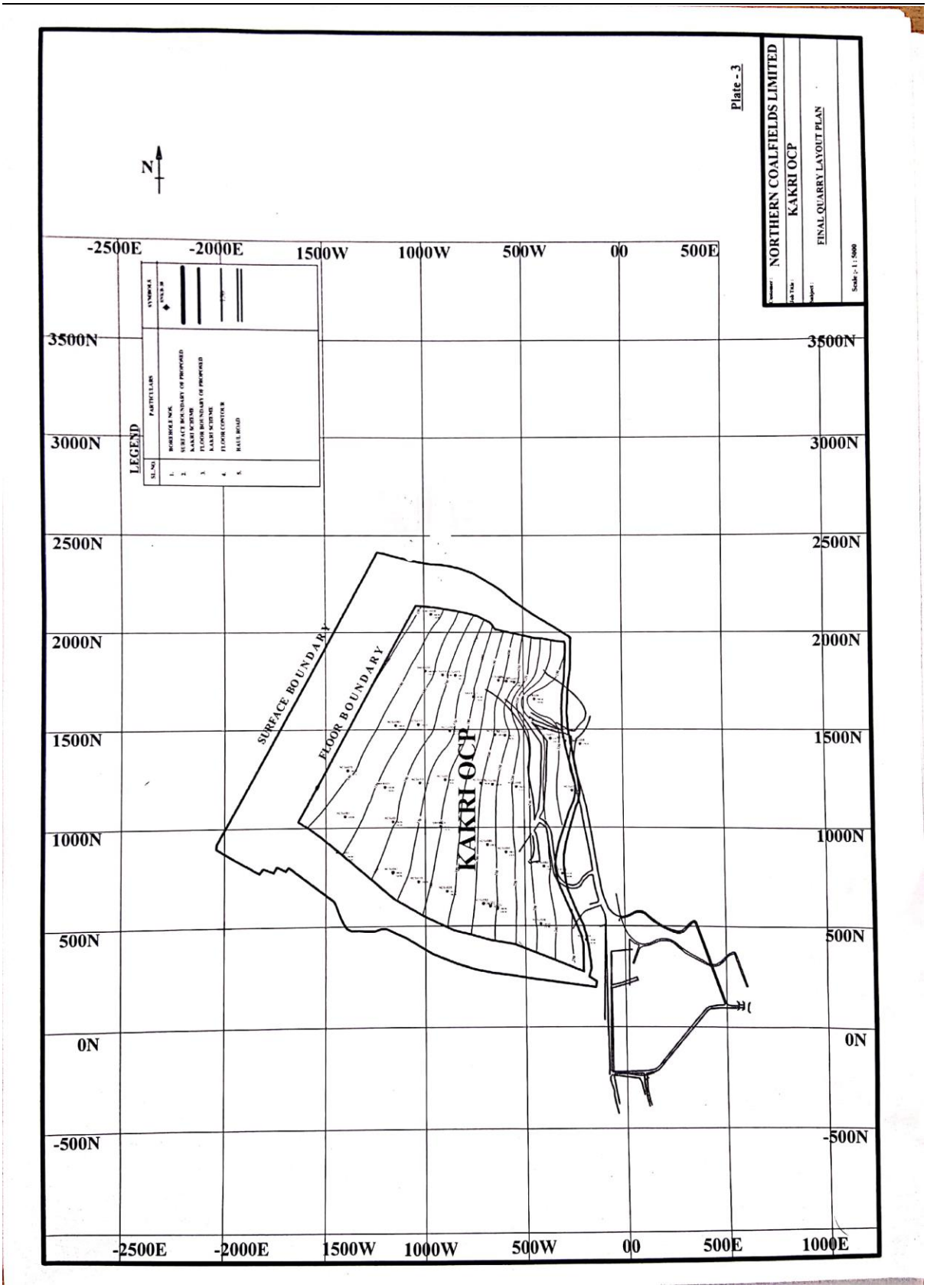


Plate - 3
NORTHERN COALFIELDS LIMITED
KAKRI OCP
FINAL QUARRY LAYOUT PLAN
Scale :- 1 : 5000
N
LEGEND
SL NO
PARTICULARS
SYMBOLS
1. BOREHOLE NOS.
2. SURFACE BOUNDARY OF PROPOSED KAKRI SCHEME
3. FLOOR BOUNDARY OF PROPOSED KAKRI SCHEME
4. FLOOR CONTOUR
5. HAUL ROAD
-2500E
-2000E
1500W
1000W
500W
00
500E
1000E
3500N
3000N
2500N
2000N
1500N
1000N
500N
0N
-500N
SURFACE BOUNDARY
FLOOR BOUNDARY
KAKRI OCP

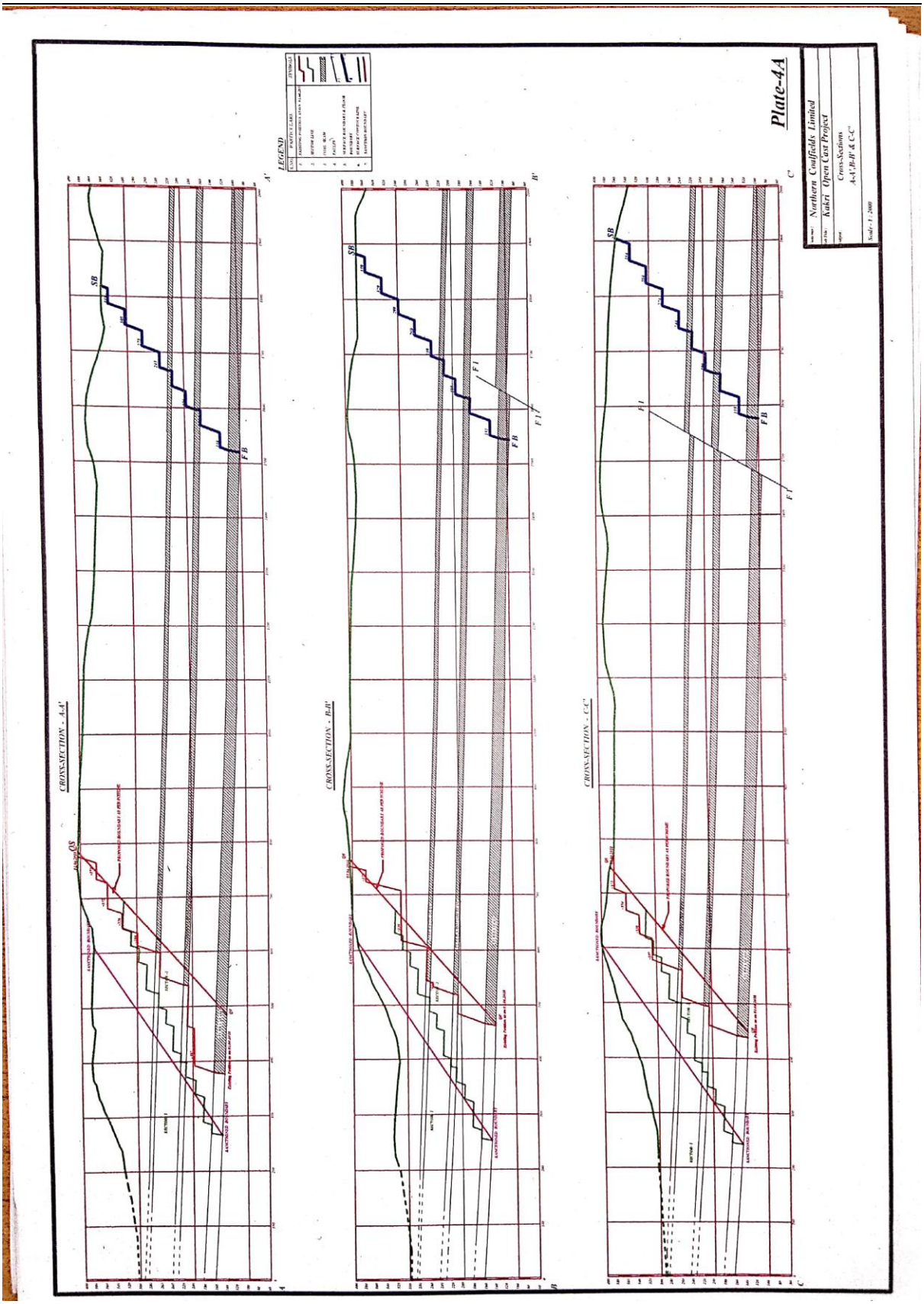


Plate-4A
Northern Coalfields Limited
Kakri Opencast Project
Cross-Sections
A-A',B-B' & C-C'
Scale-1:2000
LEGEND
CROSS-SECTION - A-A'
CROSS-SECTION - B-B'
CROSS-SECTION - C-C'
SB
FB
F1

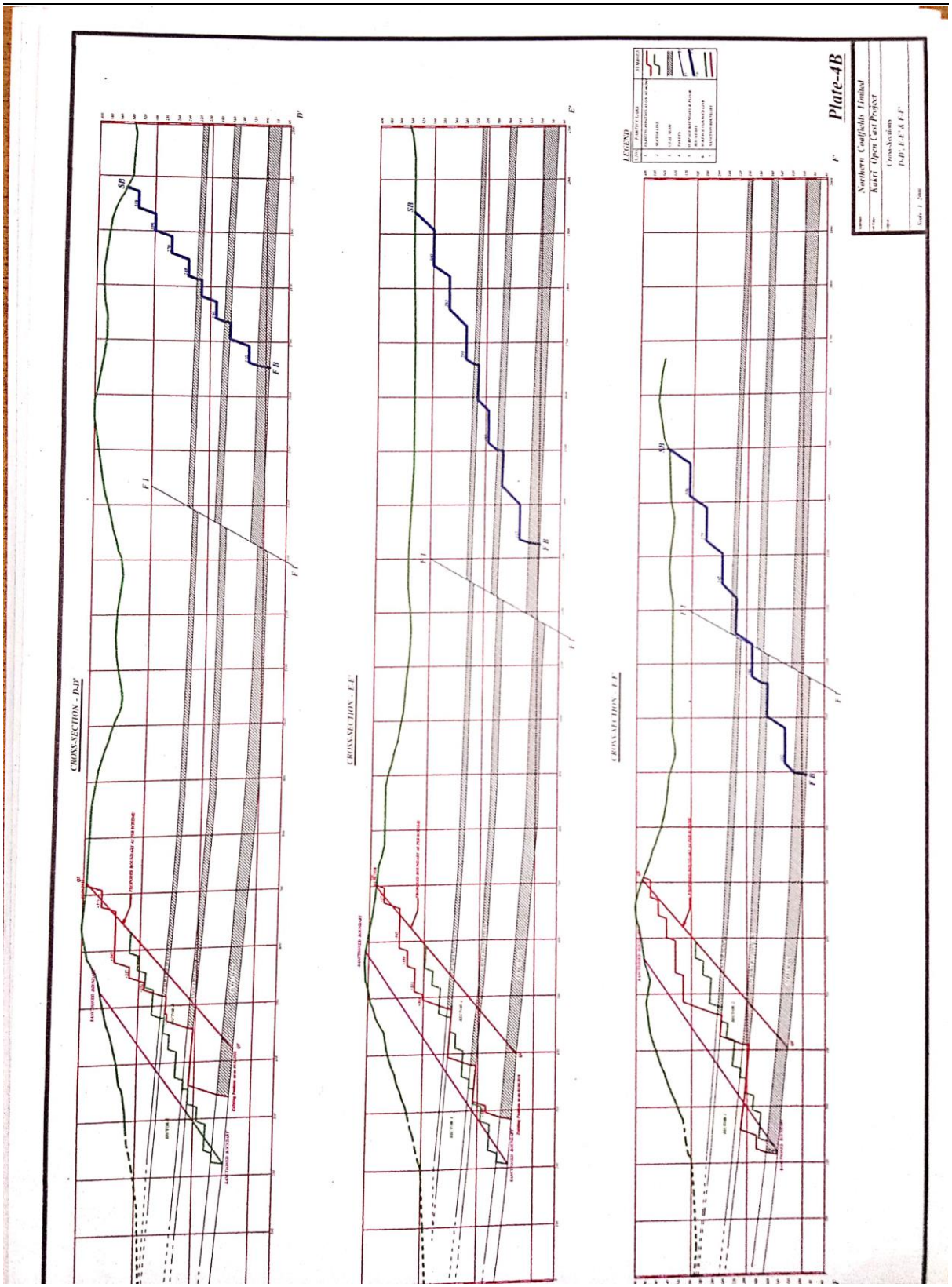
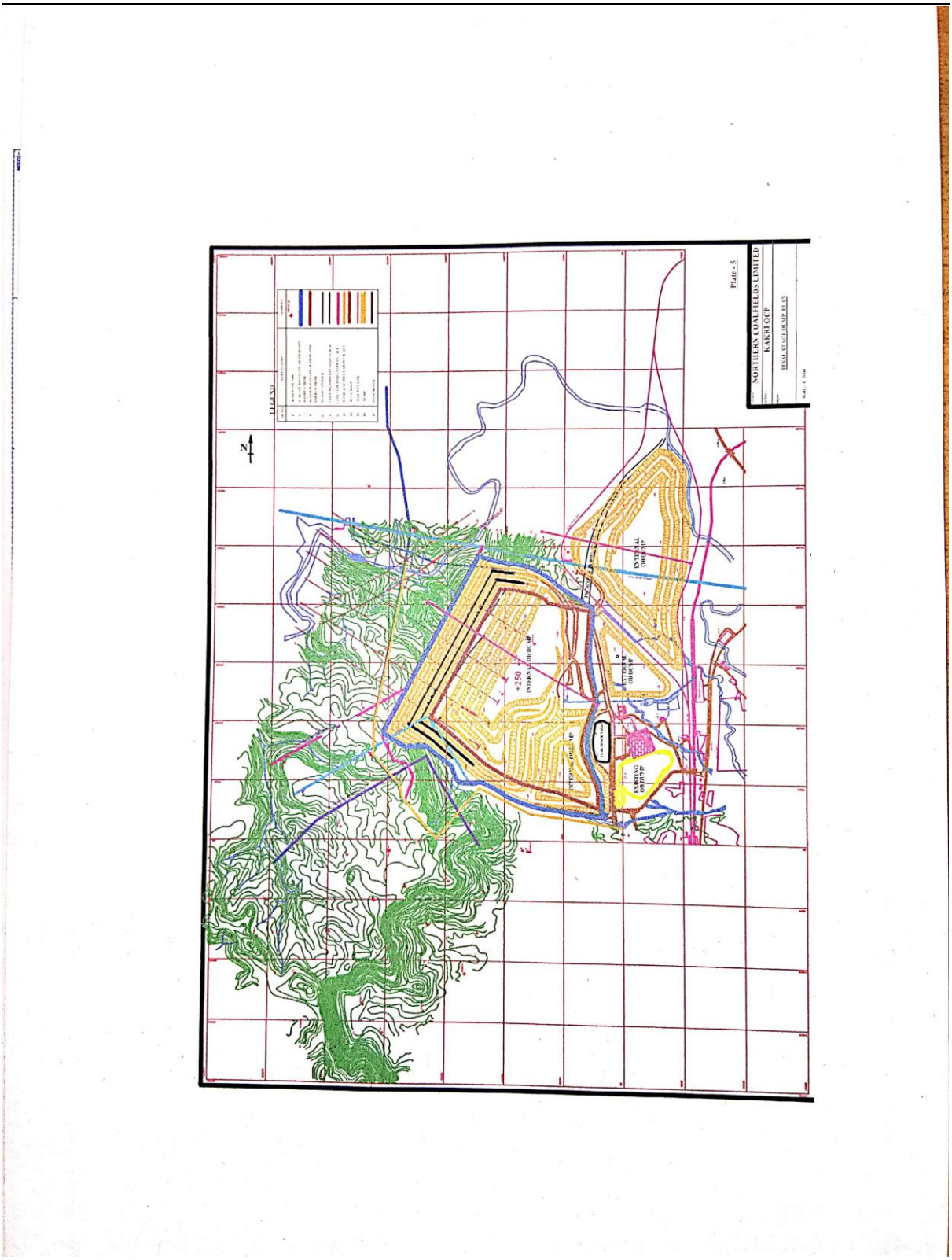


Plate-4B
Northern Coalfields Limited
Kakri Open Cast Project
Cross-Sections
D-D', E-E', F-F'
LEGEND
CROSS SECTION - D-D'
CROSS SECTION - E-E'
CROSS SECTION - F-F'
SB
FB


NORTHERN COALFIELDS LIMITED
KAKRI OCP
Plate - 5
LEGEND
N
EXTERNAL OB DUMP
INTERNAL OB DUMP
+250
EXISTING OB DUMP
EXISTING OB DUMP

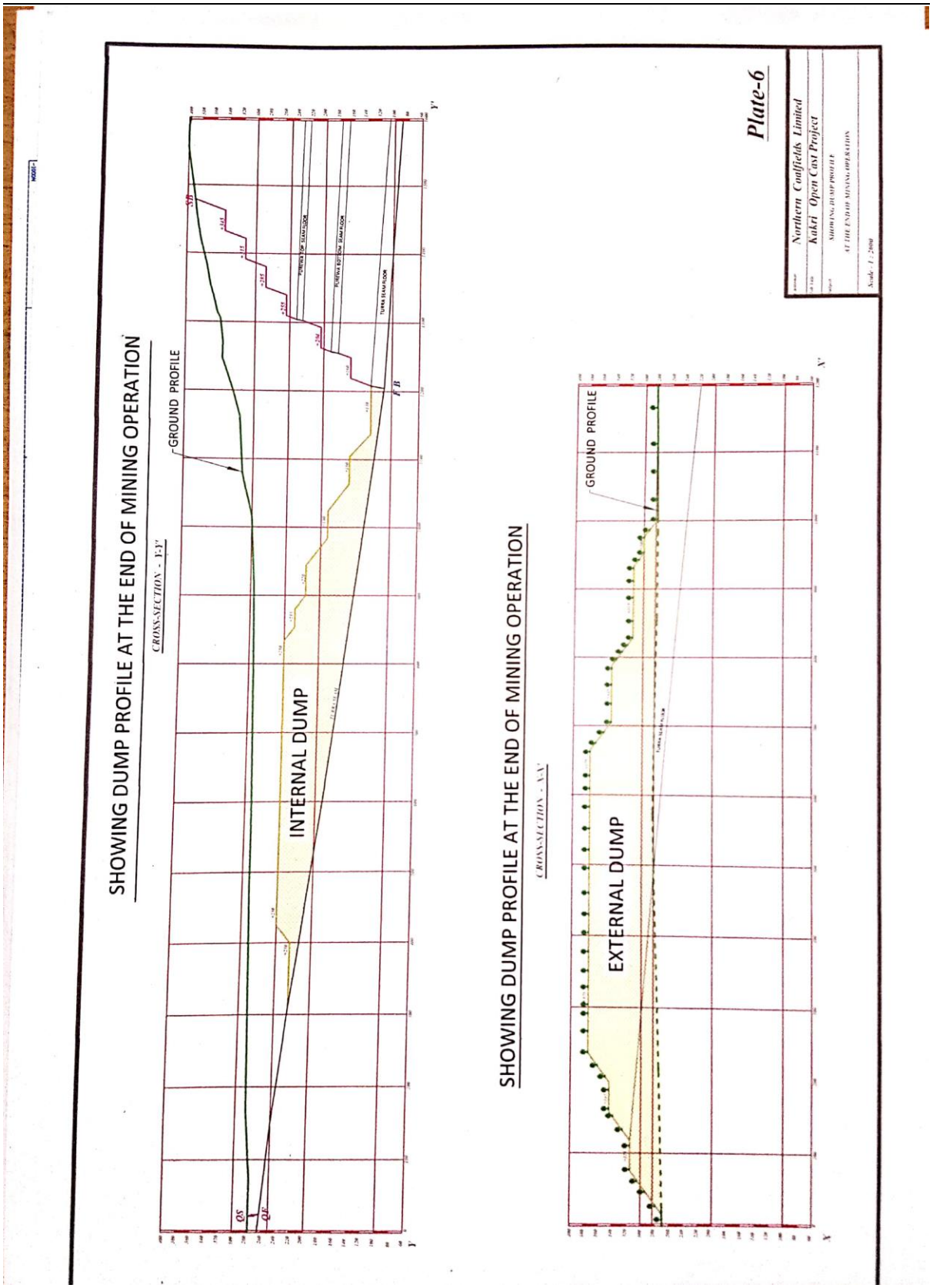
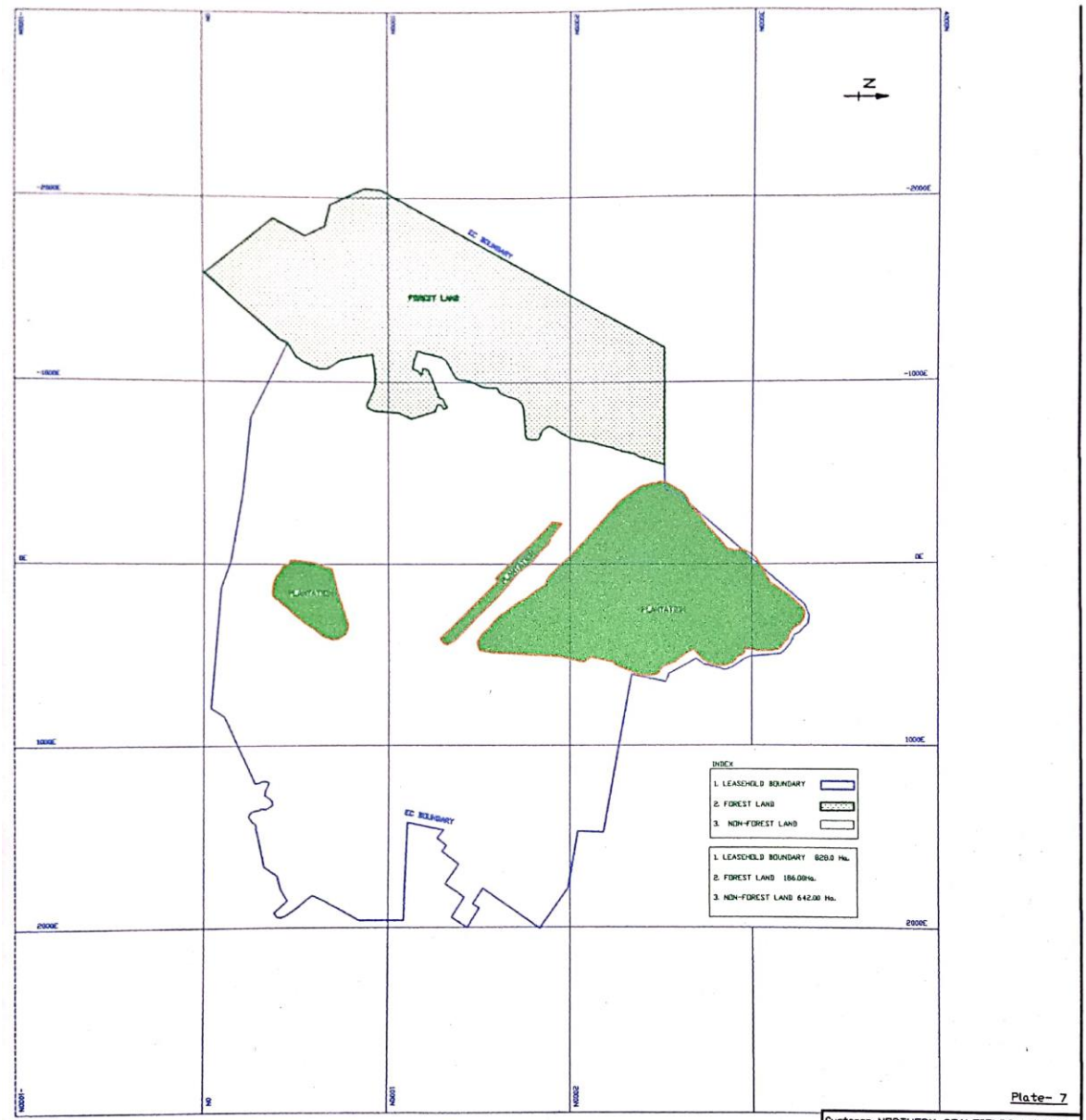
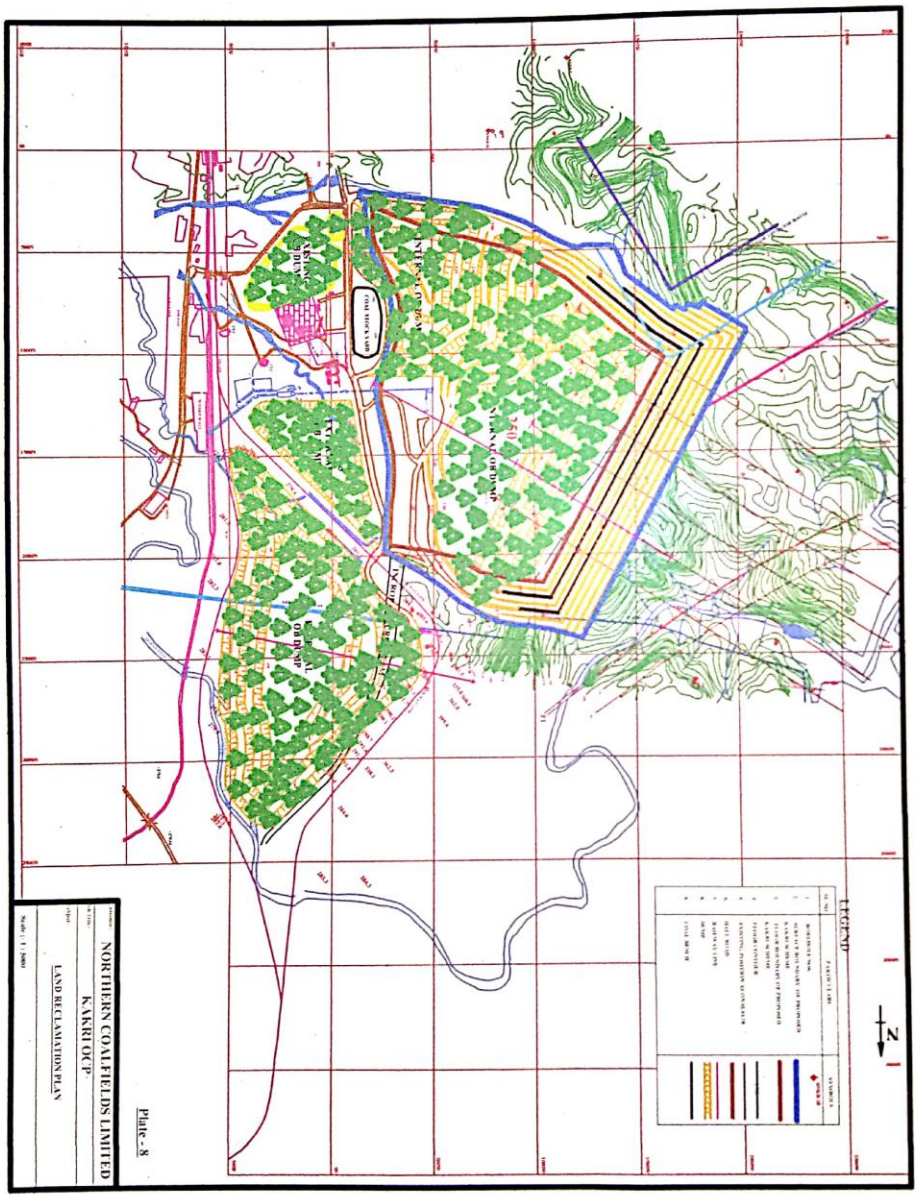
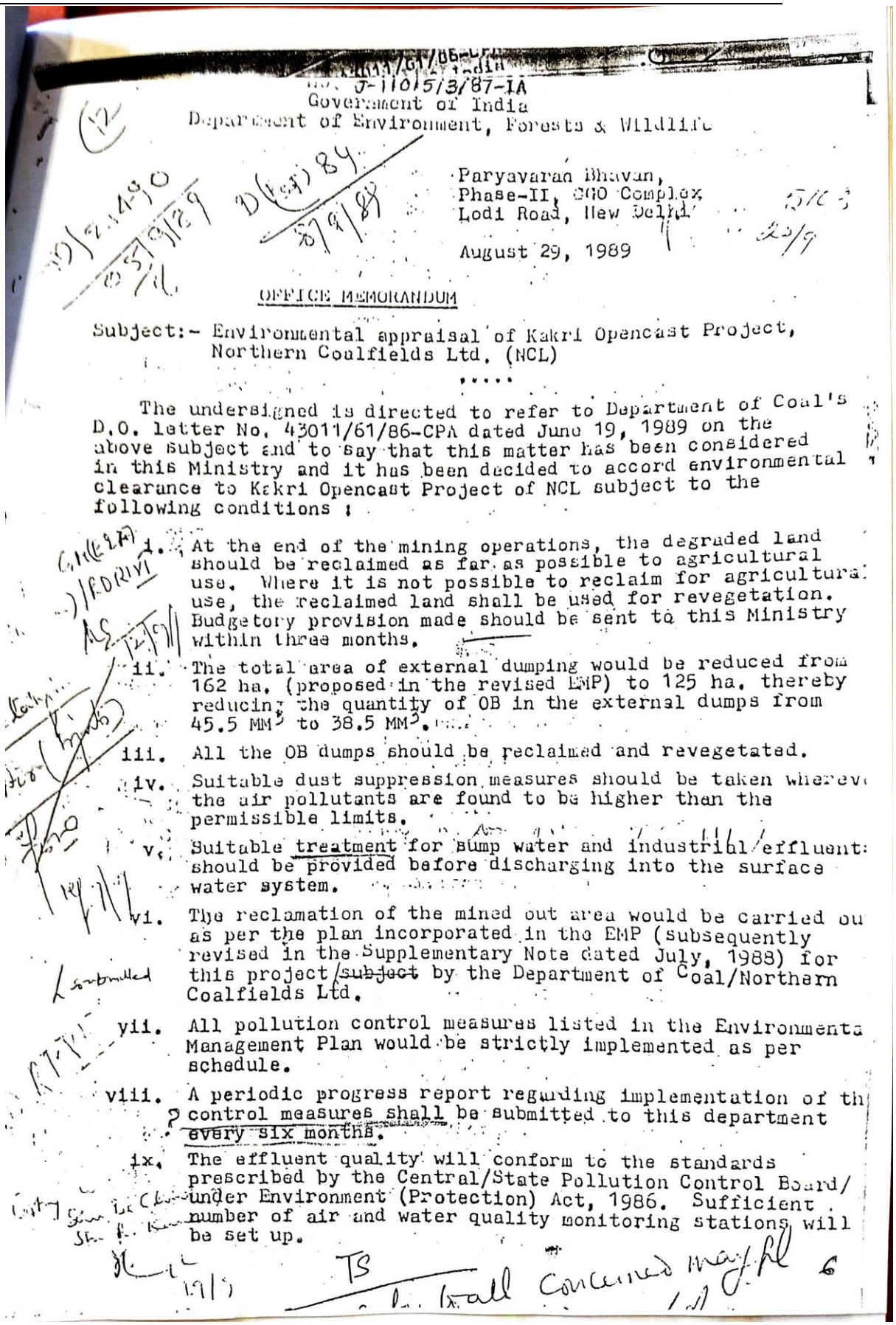


Plate-6
Northern Coalfields Limited
Kakri Open Cast Project
SHOWING DUMP PROFILE
AT THE END OF MINING OPERATION
Scale : 1 : 2000
SHOWING DUMP PROFILE AT THE END OF MINING OPERATION
CROSS-SECTION - Y-Y'
GROUND PROFILE
INTERNAL DUMP
SHOWING DUMP PROFILE AT THE END OF MINING OPERATION
CROSS-SECTION - X-X'
GROUND PROFILE
EXTERNAL DUMP


N
FOREST LAND
EC BOUNDARY
INDEX
1. LEASEHOLD BOUNDARY
2. FOREST LAND
3. NON-FOREST LAND
1. LEASEHOLD BOUNDARY 828.0 Ha.
2. FOREST LAND 186.00Ha.
3. NON-FOREST LAND 642.00 Ha.
Plate- 7
Customer NORTHERN COALFIELDS LIMITED
Project KAKRI OCP
Subject LAND USE PLAN
Colliery Surveyor
Project Manager
Project Officer
Nodal Officer(ENV)
Area Survey Officer
Staff Officer Mining
General Manager


NORTHERN COALFIELDS LIMITED
KAKRI OCP
LAND RECLAMATION PLAN
Plate - 8
LEGEND
N



J-11015/3/87-IA
Government of India
Department of Environment, Forests & Wildlife

Paryavaran Bhavan,
Phase-II, CGO Complex
Lodi Road, New Delhi

August 29, 1989

OFFICE MEMORANDUM

Subject:- Environmental appraisal of Kakri Opencast Project, Northern Coalfields Ltd. (NCL)

.....

The undersigned is directed to refer to Department of Coal's D.O. letter No. 43011/61/86-CPA dated June 19, 1989 on the above subject and to say that this matter has been considered in this Ministry and it has been decided to accord environmental clearance to Kakri Opencast Project of NCL subject to the following conditions :

i. At the end of the mining operations, the degraded land should be reclaimed as far as possible to agricultural use. Where it is not possible to reclaim for agricultural use, the reclaimed land shall be used for revegetation. Budgetory provision made should be sent to this Ministry within three months.

ii. The total area of external dumping would be reduced from 162 ha. (proposed in the revised EMP) to 125 ha. thereby reducing the quantity of OB in the external dumps from 45.5 MM^3 to 38.5 MM^3.

iii. All the OB dumps should be reclaimed and revegetated.

iv. Suitable dust suppression measures should be taken wherever the air pollutants are found to be higher than the permissible limits.

v. Suitable treatment for sump water and industrial effluents should be provided before discharging into the surface water system.

vi. The reclamation of the mined out area would be carried out as per the plan incorporated in the EMP (subsequently revised in the Supplementary Note dated July, 1988) for this project ~~subject~~ by the Department of Coal/Northern Coalfields Ltd.

vii. All pollution control measures listed in the Environmental Management Plan would be strictly implemented as per schedule.

viii. A periodic progress report regarding implementation of the control measures shall be submitted to this department every six months.

ix. The effluent quality will conform to the standards prescribed by the Central/State Pollution Control Board/ under Environment (Protection) Act, 1986. Sufficient number of air and water quality monitoring stations will be set up.

x. Regular monitoring of various environmental quality parameters would be carried out by the project authorities and the results of the monitoring would also be included in the six monthly progress report to be submitted to this Ministry.

xi. The project will have an Environmental Cell for monitoring quality of water, air, solid waste, greening and other action plans for protection of environment.

xii. This Ministry may stipulate any other condition as may be required in the interest of environmental protection.

(ii. These conditions and safeguards will be implemented, among others, under the Environment (Protection) Act, 1986.

Failure to comply with any of the conditions mentioned above would result in withdrawal of the environmental clearance granted hereby.

(R. Mehta)
Scientist SE

Secretary
Department of Coal
Shastri Bhavan, New Delhi

Copy to : 1. Chairman-cum-Managing Director, Northern Coalfields Ltd., P.O. Singrauli Collieries, Distt. Sidhi (M.P.)

2. Regional Director, RI-VI, CMPDI, IWSS Complex, P.O. Singrauli, Distt. Sidhi, M.P.

3. Conservator of Forests, Regional Office, Western Zone, E-3/240, Arera Colony, Bhopal (M.P.)

4. DIG(FC), Ministry of Environment & Forests, New Delhi

(R. Mehta) 29/8/89
Scientist SE

13/05/2005 10:44 FAX 91 011 23311454 C I L DEL

Annexure - III

No.J-11015/176/2003-IA.II (M)
Government of India
Ministry of Environment and Forests

Paryavaran Bhavan
C.G.O.Complex,
ad, New Delhi-110 003

To

Dated the 11th May 2005

Director (Tech) (Project & Planning),
Kakri Project,
Northern Coalfields Ltd.,
P.O. Kakri,
Sonebhadra,
Uttar Pradesh

Subject: Kakri opencast coal project of M/s Northern Coalfields Ltd. located in Village Kakri, Tehsil Dudhi, District Sonebhadra in Uttar Pradesh - environmental clearance reg.

Sir,

This has reference to the Ministry of Coal, Government of India letter No. 43011/15/2002-CPAM dated 24.03.2003 and your letters No. CGM/KKR/Env.Clearance/2003/581 dated 14.03.2003 & subsequent letters dated 01.07.2004, 28.02.2005, 28.03.2005 & 12.04.2005 on the subject mentioned above. The Ministry of Environment & Forests has considered the environmental clearance application. It has been noted that the total lease area the project is 828.0 ha out of which 186.0 ha is forestland, 359.0 ha is tenancy land and 283.0 ha Government land. Area proposed for mining is 245.0 ha, 125.0 ha is kept for OB dumps, 5.0 ha for mineral storage, 14.0 ha for infrastructure, 9.5 ha for roads, 176.0 ha for green belt, 0.5 ha for ETP, 7.0 ha for CHP, 46.0 ha for township and 200.0 ha is safety zone, rehabilitation etc. No National Park/Wildlife Sanctuary/ Biosphere reserve is located within core & buffer zone of the mine lease area. There are three villages comprising 1066 households are in the core zone. Project affected families have already been rehabilitated and resettled. The annual targeted production capacity of the mine is 3.0 million tonnes. Working will be open cast by mechanised method involving blasting. Ultimate working depth will be 182 m bgl. Total water requirement for the project is 2530 m^3/d, out of which 1730 m^3/d will be met from mine water (sump) and 800 m^3/day from IWSS of NCL. The total volume of OB to be handled is 162 million m^3, out of which 31 million m^3 is to be dumped internally, 45 million m^3 go to external dump and the balance 86 million m^3 to be dumped over backfilled area of Bina OCP. NOC from the State Pollution Control Board obtained on 11.06.2004. Public hearing held on 09.04.2004. Project report has been approved on 07.04.2001 for annual targeted capacity of 3.0 million tonnes. Capital cost of the project is Rs.187.97 crores.

2. The Ministry of Environment and Forests hereby accords environmental clearance to the above mentioned coal mining project of M/s Northern Coalfields Ltd. for 3.0 MTY production by opencast method involving total lease area of 828.0 ha under the provisions of the Environment Impact Assessment Notification, 1994 as amended on 04.05.1994 and 10.04.1997 subject to strict compliance of the terms and conditions mentioned below:

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Annexure - III

A. Specific conditions

(i) Top soil should be stacked with proper slope at earmarked site(s) only with adequate measures and should be used for reclamation and rehabilitation of mined out areas.

(ii) OB dumps should be stacked at earmarked dump site(s) only and should not be kept active for long period. Proper terracing of OB dump should be carried out so that the overall slope will come down to 28 degree The excavated area should be backfilled simultaneously with the mining operation. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests on yearly basis.

(iii) Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains should be regularly desilted and maintained properly.

Garland drains of appropriate size should be constructed, to collect surface run-off from the OB and waste dump site(s) and taken to settling pond before discharge.

(iv) Dimension of the retaining wall at the toe of dumps and OB benches within the mine to check run-off and siltation should be based on the rain fall data.

(v) Green belt should be raised in an area of 176.0 ha by planting the native species around the ML area, OB dump sites, colony etc. in consultation with the local DFO / Agriculture Department. The density of the trees should be around 2500 plants per ha.

(vi) The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.

(vii) Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year - pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to MOEF, Central Ground Water Authority and Regional Director Central Ground Water Board.

(viii) The project authorities should meet the water requirement of nearby village(s) in case the village wells go dry due to de-watering of the mine.

(ix) Coal handling plant should be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.

Annexure - III

(x) Consent to operate should be obtained from SPCB for the enhanced production.

(xi) Vehicular emissions should be kept under control and regularly monitored.

(xii) Digital processing of the entire lease area using remote sensing technique should be done regularly once in three years for monitoring land use pattern and report submitted to MOEF and its regional office.

(xiii) A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.

B. General Conditions

(i) No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forests.

(ii) No change in the calendar plan including excavation, quantum of mineral coal and waste should be made.

(iii) Atleast four ambient air quality monitoring stations should be established in the core zone as well as the buffer zone for RPM, SPM, SO_2, NO_x, and CO monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Data on ambient air quality (RPM, SPM, SO_2, NO_x, and CO) should be regularly submitted to the Ministry including its Regional Office at Lucknow and to the State Pollution Control Board/Central Pollution Control Board once in six months.

(iv) Drills should either be wet operated or with dust extractors.

(v) Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements on haul roads, wagon loading, dumps, loading & unloading points should be provided and properly maintained.

(vi) Adequate measures should be taken for control of noise levels within prescribed standards. Workers engaged in blasting and drilling operations, operations of HEMM, etc., should be provided with ear plugs/muffs.

(vii) Industrial wastewater (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422(E) dated 19th May 1993 and 31st December 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of effluents from workshop.

(viii) Acid mine water, if any has to be treated and disposed of after conforming to the standard prescribed the competent authority.

Annexure - III

(ix) Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and heath aspects.

Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to coal dust and take corrective measures, if needed.

(x) Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.

(xi) A separate environmental management cell with suitable qualified personnel should be set up under the control of a senior Executive, who will report directly to the Head of the organization.

(xii) The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purposes. Year-wise expenditure should be reported to the Regional Office, Lucknow of the MOEF and to the Ministry.

(xiii) The Regional Office of this Ministry located at Lucknow shall monitor compliance of the stipulated conditions. The Project authorities should extend full cooperation to the officer(s) of the Regional Office by furnishing requisite data/information/monitoring reports.

(xiv) A copy of the clearance letter will be marked to the concerned Panchayat /local NGO, if any, from whom any suggestions/representation has been received while processing the proposal.

(xv) The project authorities should inform to the Regional Office located at Lucknow regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.

(xvi) State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's/Tehsildar's Office for 30 days.

(xvii) The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and may also be seen at web site of the Ministry of Environment and Forests at http://envfor.nic.in .

3. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

Annexure - III

5

5. The above conditions will be enforced *inter-alia*, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules.

(Dr. T. Chandini)
Additional Director

Copy to:

1. Secretary, Ministry of Coal, Government of India, Shastri Bhawan, New Delhi.
2. Secretary, Department of Environment, Government of Uttar Pradesh, Secretariat, Lucknow.
3. Secretary, Department of Forests, Government of Uttar Pradesh, Secretariat, Lucknow.
4. Chief Conservator of Forests (Central), Ministry of Environment & Forests, Regional Office (CZ), Kendriya Bhandar, 5th Floor, Sector - H, Aliganj, Lucknow -226 020
5. Chairman, Central Pollution Control Board, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
6. Chairman, Uttar Pradesh State Pollution Control Board, IIIrd floor, PICUP Bhawan,
   Vibhuti Khand, Gomti Nagar, Lucknow - 226020
7. Member Secretary, Central Ground Water Authority, A2, W3 Curzon Road Barracks, K.G. Marg, New Delhi-110001.
8. District Collector Sonebhadra District, Uttar Pradesh.
9. Shri M.K.Shukla, Chief General Manager, Coal India Limited,407/8, Surya Kiran, 19 Kasturba Gandhi Marg, New Delhi-110 001.
10. EI Division, Ministry of Environment & Forests, EI Division, New Delhi.
11. Monitoring File.
12. Guard File.
13. Record File.

31C

27/08/2007 14:02 FAX 91+11+22017484 C I L DELHI

No.J-11015/218/2007-IA.II(M)
Government of India
Ministry of Environment & Forests

(P & P.) Directorate
N. C. L.
Receipt No. MIN 406
Date 27-8-07

Paryavaran Bhawan,
C.G.O.Complex, Lodi Road,
New Delhi -110003.

Dated: 20th August 2007

To
Chief General Manager,
M/s Northern Coalfields Ltd.,
Sonebhadra District (U.P.) – 231220.

Sub: Kakri Expansion Opencast Coal Mine Project (production from 3 MTPA to 4 MTPA in a lease area of 828 ha) of M/s Northern Coalfields Ltd. (NCL), located near village Kakri, Tehsil Dudhi, District Sonebhadra, Uttar Pradesh - environmental clearance – reg.

Sir,

This has reference to letter No. 43011/49/2007 dated 03.03.2007 of ministry of Coal forwarding your application and your subsequent letter dated 14.06.2007 on the above-mentioned subject. The Ministry of Environment & Forests has considered your application. It has been noted that the application is for expansion of the existing Kari Opencast Project in terms of production capacity from 3 MTPA to 4 MTPA. Environmental clearance was granted by the Ministry of Environment & Forests vide letter No. J-11015/176/2003-IA.II(M) dated 11.05.2005. There is no increase in lease area of 828 ha. Forestry clearance has been obtained on 30.05.1989 for 185.84ha. Coal from CHP is dispatched to the TPS is through controlled loading system mounted over MGR loop line. The existing equipment, CHP capacity and the MGR line are adequate to meet the enhanced coal production. Mineral and OB transportation would be by increasing the capacity of dumpers from 50-T to 85-T capacity. Post mining land use would be the same as in the project approved for 3 MTPA. Maximum working depth remains 182 m for the expansion project. The total area that would be afforested would be 507 ha and a water reservoir of 49 ha would be left in the decoaled void. There is no change in the quantum of OB excavation and no change in pit and dump design as a result of accelerated OB generation. Dumping of OB of 38.5 Mm3 Mm3 would be in external dump of 125 ha and 44.57 of OB would be backfilled in a void of 196 ha. There will be no change in the annual demand of water of 1053 m3/d which is being drawn from Gobind Ballabh Pant Sagar. The increase of water req. from 2693 m3/d to 3543 m3/d would be met from mine seepage water. The mine water discharge will increase from 2106 m3/d at 3 MTPA to 2550 m3/d at 4 MTPA. Capacity of CHP, ETP and workshop to treat the effluents is adequate to meet the additional wastewater generated. ETP sludge (3140 T/Y) would be disposed off by suitable land farming and STP sludge (4001/Y) will be used for horticulture and agriculture. The enhanced production of 4 MTPA would be achieved through increasing the productivity of equipment and personnel and number of working days. Balance life of the mine is 6 years. Capital cost of the project is 186.59 crores. Public Hearing was held for the project at 3 MTPA capacity on 09.04.2004.

2. The Ministry of Environment & forests hereby accords environmental clearance for the above-mentioned Kakri Expansion Opencast Coal Mine Project of M/s Northern Coalfields Ltd. for expansion in production of coal from 3 MTPA to 4 MTPA rated capacity in 828

CMD - for kind information. cc To (1) GM (ENVT) (2) GM (CP) (3) GM. Kakri (4) RD. CMPDI RD-II
S.O (Env) Survey Officer

K-2

existing lease area of 878 ha under Section 7.2 of the Environmental Impact Assessment Notification, 2006 and subsequent amendments thereto and under Para 2.1.1 of MOEF Circular dated 13.10.2006 subject to the compliance of the following terms and conditions mentioned below:

(i) Mining operations during the balance life of mine shall be carried out as per the approved Mining Plan

(ii) The expansion in production shall be achieved with no change in the quantum of OB generation and no change in the pit and dump design. Monitoring and management of existing reclaimed dumpsites should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests and its Regional office located at Lucknow on yearly basis.

(iii) No additional external source of water shall be required for the expansion, the increase of water requirment from 2693 m3/d to 3083 m3/d shall be met from mine seepage water.

(iv) The CHP shall be fully enclosed and provided with bag filters which are regularly operated and maintained.

(v) A progressive afforestation plan shall be implemented covering a total area of 507 ha, which includes reclaimed external OB dump, backfilled area along ML boundary and green belt, along roads (9.5 ha), colony (46 ha) and along vacant land by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.

(vii) Of the excavated area of 245 ha, an area of 196 ha shall be backfilled and reclaimed with plantation and the balance 49 ha of the decoaled void being converted into a water reservoir would be gently sloped and the higher benches of which shall be stabilised by plantation/afforestation by planting native plant species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.

(viii) A detailed Mine Closure Plan along with details of post mining landuse with physical and financial targets shall be submitted to this Ministry and to the Regional office located at Lucknow within six months of issuance of this clearance letter.

3. The above conditions are in addition to the conditions stipulated vide environmental clearance letter No. J-11015/176/2003-IA.II(M) dated 11.05.2005.

4. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

5. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment (Protection) Act, 1986.

6. The above conditions will be enforced *inter-alia*, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act

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1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules.

(Dr.T.Chandini)
Director

Copy to:

1. Secretary, Ministry of Coal, Government of India, Shastri Bhawan, New Delhi.
2. Secretary, Environment Department, Government of Uttar Pradesh, Secretariat, Lucknow.
3. Chief Conservator of Forests (Central), Ministry of Environment & Forests, Regional Office, B-1/272, Sector K, Aliganj, Lucknow – 226020.
4. Chairman, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi -110032.
5. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
6. Shri M.K. Shukla, CGM, Coal India Limited, SCOPE Minar, Core-I, 4t Floor, Vikas Marg, Laxminagar, New Delhi.
7. District Collector, Sonebhadra, Government of Uttar Pradesh.
8. EI Division, Ministry of Environment & Forests, New Delhi.
9. Monitoring File 10. Guard File 11. Record File